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The PHOTOFACT Servicer

May 15, 1950 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ Vol. 10, Nos. 93 & 94

From the March, 1950, Issue of -

SREPCO NEWS

Issued in the interest of our customers.

SREPCO

Inc.

Standard Radio and Electronic Products

135 E. Second St., Dayton 2, Ohio. FU 2174
119 W. Main St. Springfield, Ohio. 2-2251

CENTRALLY LOCATED IN BOTH CITIES

RADIO VS TV SERVICE

"Radio Servicemen who do no TV servicing are wondering where the tremendous volume of work is coming from. All the shops are as busy as they can be.

"The answer seems to be that shops doing TV service are covered up too. The TV customers are pushing their servicemen hard and there is a tendency to let the regular radio service go to get the TV customer out of his hair.

"Our only purpose in bringing this matter up is to analyze its effect on future radio service business. It appears that the TV service, highly specialized as it is, may well afford a much larger volume than radio ever did. Radio and car radio, however, have produced a good volume of business for years and propose to do so for years to come.

"If you are the only serviceman in your community and neglect to care for the AM and FM radio service you will leave a demand that can only be filled by a competitor. If you have all the work you can do it may be the time to expand into a real two-man shop.

"If you do not have the proper equipment or potential for TV you will certainly find plenty of regular service now. And as always, a sure way to get radio service business is to provide for auto radio service and let the public know it."

* * *

HERE'S ADMIRAL'S NEW TV MODEL NUMBERING SYSTEM

The first digit of the model number indicates the type of cabinet. For example - 1 indicates table model; 2 indicates consolette, television only; and 3 indicates console combination.

The second digit indicates the picture tube size - 2 indicating 12" tube, 6 indicating 16" tube, and 9 indicating 19" tube.

The first letter following the first two digits indicates the model series.

The next digit indicates the style of cabinet, and the last digit indicates the color of the cabinet - - 1 indicating ebony, 2 mahogany plastic, 5 walnut wood, 6 - mahogany wood, and 7 blond wood.

There is no longer any correlation between the model numbering system and the chassis designation.

As in the past, we will continue to cover the receivers in PHOTOFACT Folders under their designations with a cross-reference to the various models using a given chassis.

* * *

INTERESTING LETTER -

Howard W. Sams & Co., Inc.:

Enclosed find our check for $5.00 to cover cost of
1000 Doorknob Hangers

Thank you for the Christmas Gift of 100 of these. We tried them and were very pleased with the results.

Yours very truly,

Brown Electric Service
Perry L. Brown (Signature)
Waverly, Iowa

The Doorknob Hanger is an "all year round" item -
There are a few left from our 2nd printing -
First Come First Served - See Servicer in Set No. 80.

FIELD EXPERIENCES -

For every service "Field Experience" published, we issue a certificate good for one PHOTOFACT Folder Set. Awards are issued at the time of publication. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or for the results obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Co., Inc.

* * *

WEBSTER CHICAGO Automatic
Record Changer, Model No. 160

Complaint: Record does not finish playing. When about 1/2 way through, pickup arm lifts and returns to starting point.

Cause: The trouble was that the ears on main cam actuating gear, hit below rubber bumper, which had raised up off stem on velocity trip lever assembly, allowing velocity trip lever to move towards main cam actuating gear, triggering main cam pawl, which is part of main cam assembly, engaging main cam actuating gear, causing main cam assembly to rotate moving rocker arm roller, causing next record to fall.

Remedy: Push down rubber bumper onto stem as far as it will go and apply vibration proof radio cement and let dry.

Jerome Vogel
2333 Eiler Avenue
Pittsburgh 10, Penn.

* * *

VM Phonograph Model 8025A

Complaint: Hum level coming from the speaker was so high that it was objectionable. This was a new set and I believe a new model.

Cause: I found that the 1 meg plate load resistor of the 12AT6 tube was connected to pin No. 7, the plate supply of the 50C5.

Remedy: I connected it to pin 6, the screen, of the 50C5 tube where there is an additional stage of filtering and the hum was reduced until it was no longer objectionable.

John A. Diller
John's Radio Shop
Hesston, Kans.

CHEVROLET Model 986241
Photofact Set No. 58, Folder No. 7

Complaint: Radio intermittent. This particular radio would play for about five days and then stop playing. The radio would go back in normal operation upon trying to check the trouble. I let the set "cook" for about five hours and same stopped.

Cause: By being careful, I traced the signal through the audio and detector stages and the signal died. The transformer No. 1218661 was causing the trouble. Upon inspection of this transformer, I found the secondary open.

Remedy: The repair is simple. Clean the insulation from the wire and resolder. In fact, clean all wires and resolder just to be sure.

Wm. H. Bargainer
Huff's Radio Service
Pollok, Texas

* * *

FADA Models S-1015, S-1020

Complaint: Raster O. K., but no picture or sound.

Remedy: Replace filter resistor (1750 ohms) located on top of chassis. This resistor opens.

FADA Models S-1015, S-1020

Complaint: Set smokes. No raster.

Remedy: Look for shorted 56 MMF. capacitor and burned out 1K resistor inside the deflection yoke, Replace capacitor with a higher voltage rating.

DUMONT Model R-A 103
Photofact Set No. 93, Folder No. 4

Complaint: Raster and picture O. K. No sound.

Remedy: Look for shorted 6AU6 (V10) 2nd sound IF tube. This tube will ruin R60 1K resistor, resulting in no plate voltage to V10.

Editor's Note: All three above experiences were contributed by:

Henry Bollmann
101 Oak Street
Bradley Gardens
R. F. D., Somerville, N. J.

STEWART-WARNER
Model 9104 TV Combination

Complaint: TV picture and sound disappear suddenly, usually with odor of burning insulation, and TV pilot light goes out, but radio and phonograph perform normally.

Cause: A dangling blue wire runs across under the tuning turret to feed the TV pilot light. Sometimes this wire catches on the metal ends of the turret, and shorts, burning itself up, and that part of the TV filament wiring directly associated with it. In one instance, a part of the change-over switch wafer was so badly charred as to require replacement.

Remedy: The remedy is to renew the burned filament leads, then dress the pilot light lead permanently away from any possible tangling with the turret.

Deane S. Kintner
Route 2, Telegraph Road
Elyria, Ohio

* * *

CHEVROLET Model 986241
Photofact Set No. 58, Folder No. 7

Complaint: Oscillator drift followed by dead receiver (at 7Q7 convertor). As usual the receiver will become alive when meter test probe is touched to any of the 7Q7 element pins, and set may be left all day without cutting out, and upon installation in the automobile the receiver will put up a great fuss with its unnecessary evil, another intermittant.

Remedy: This is the third one of these: Replace Item No. 19, 1420 MMFD. convertor anode decoupling capacitor with a good grade capacitor. If a 1420 MMFD. is not used, oscillator trimmer will have to be readjusted for proper tracking. Normal voltage at this capacitor will read 65 volts D. C. When the capacitor acts up, your voltage will jump to approximately 100 volts D. C.

RCA Model 66X2
Photofact Set No. 7, Folder No. 23

Complaint: Dead from 2nd detector back to antenna. Voltages all normal as given by PHOTOFACT Chart.

Remedy: Replace Item No. 18, 56 MMFD. capacitor (oscillator grid capacitor). Receiver will operate normally, then slowly fade down to nothing. At first you will suspect an intermittant filament or open resistor. Check 56 MMFD. and you will find it shorted in this case.

Editor's Note: Both above experiences were contributed by:

B. A. Neal Radio & Television
12 W. Wellsboro Street
Mansfield, Penn.

* * *

PHILCO Models 48-1262, 48-1282
Photofact Set No. 35, Folder No. 18

Complaint: Takes up to 1/2 hour for set to start playing after being turned on.

Remedy: I had this complaint on a 1262 and on a 1282. The trouble was the same on both sets. The voltage doubler capacitors, Items No. 7 and No. 8, were open thereby lowering the B plus voltage to about 15. At first glance, it would seem the larger double filter would be open, but a look at the schematic shows this filter, Item No. 9, is not the critical one. Replacing these filters or shunting across them temporarily, immediately lets the set play.

Myron B. Maddex, Serviceman
R. W. Schetter
7 North Main Street
Mechanicsburg, Ohio

* * *

REMOVING GRIT FROM
TUNING CAPACITOR PLATES

One of the hardest jobs is to remove certain kinds of grit from tuning capacitor plates. Some use an air compressor, if available. The second best method is using a vacuum cleaner with hose or hand type, to blow. Next is high voltage, usually 110V with a light bulb in series. Or, you can use carbon tetrachloride or other quickly evaporating cleaning fluid.

The quickest and most successful method is to use carbon tetrachloride and immediately use a blower. This gives a fast washing action and works successfully the first time in 99 cases out of 100. If not successful after the second or third try, connect the high voltage and use all three at once.

A modification of the above method is a high pressure paint sprayer or, just as good, use the low pressure paint sprayer, which is used

with tank type cleaners. (Incidentally, substitute the carbon tetrachloride for paint.)

R. T. Vauganon
S. & W. Radio & Appliances
2296 N. Sixth Street
Harrisburg, Penn.

* * *

TELECHRON Clock Radio Model 8H67
Photofact Set No. 44, Folder No. 23

Complaint: Severe a-c hum.

Probable Cause: Large a-c voltage on plate of 12SQ7. "Hot" lead of line filter capacitor, Item No. 7, makes contact with "hot" lead of AF plate bypass capacitor, Item No. 15, through thin, loosely woven spaghetti.

Remedy: Reinsulate with heavier spaghetti.

Dana Radio Service
11 Sagamore Road
Marblehead, Mass.

* * *

STROMBERG 1204 Series
Photofact Set No. 34, Folder No. 22

Complaint: Excessive hum.

Cause and Remedy: Usually due to common coupling between filter and cathode bypass sections of filter capacitor, Items Nos. 8-A, B, C, D. If the high voltage sections check okay, and they usually do, the trouble may be corrected by substituting a 25 MFD. 25V tubular unit and removing the lead between the 50L6GT cathode and low voltage section.

MOTOROLA Model CT-7

Complaint: Noisy, with intermittent oscillation.

Remedy: Plate bypass capacitor for the RF-IF stages is not securely mounted and leads break due to vibration. Check when servicing and mount properly.

EMERSON Model 644

Complaint: Heavy buzz when receiving test pattern. Lopsided response when checking alignment with sweep generator.

Cause and Remedy: The gain at the high side of the IF pass band was abnormally high while that at the low side was extremely low. When alignment was attempted, the third IF stage would align normally, but the second tuned too sharply and showed excessive gain and instability.

The loading resistor shunted across the third IF grid circuit had changed in value from 3900 ohms to 82,000 ohms. Replacement restored normal operation after set was aligned.

Editor's Note: All three experiences above were submitted by:

Francis C. Wolven
R. F. D. 2, Box 178
Saugerties, New York

* * *

REPLACING MINIATURE SOCKETS

I experienced some trouble replacing miniature sockets until I devised a simple system of installing them. By using the ring type sockets and pressing the clamp ring on carefully, a good neat installation can be made.

To install without danger of breakage, use a 5/8" deep socket from a wrench set and a large C clamp. The socket fits the ring exactly and the clamp fits the socket firmly and neatly.

John Ruble
117 E. Greene Street
Piqua, Ohio

* * *

RCA VICTOR Model 9W103, Chassis RC618B
Photofact Set No. 73, Folder No. 10

I ran into a variation of shorted trimmers in second IF transformers, on above set.

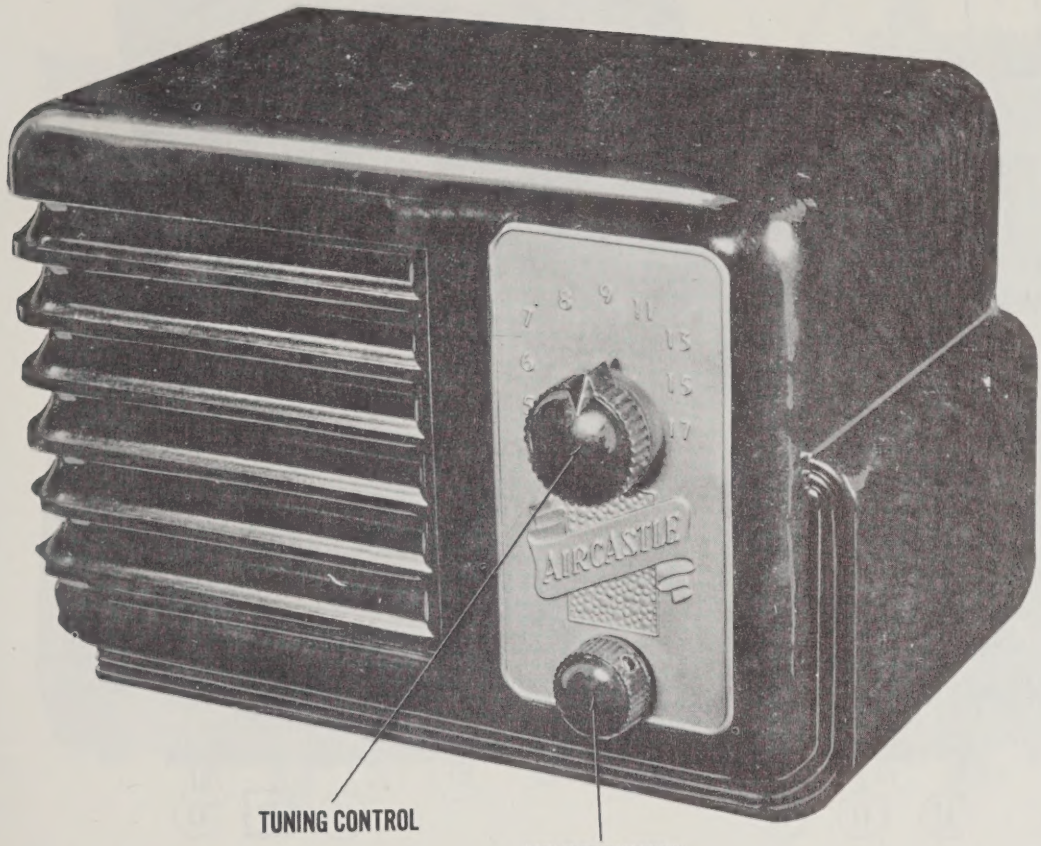
Complaint: Noisy on B. C. band - weak, fuzzy.

Cause: Second IF, Item No. L-6, leakage between primary and secondary fixed trimmers.

Remedy: Cut mica insulation and clean off wax.

R. B. Sell,
Route 1,
Rhinelander, Wis.

AIRCASTLE
MODELS 90121, 9012W



AIRCASTLE
MODELS 90121, 9012W

AIRCASTLE MODEL 9012W

TRADE NAME	Aircastle, Models 90121, 9012W
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Illinois
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types 12BE6 Converter, 12AV6 or 12AT6 DET-AVC-AF, 50B5 Power Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC RATING .27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	550-1720KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer parallel with base of dial. Use isolation trasnformer if available. If not connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to stator on rear section of tuning gang.	455KC (400 ∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output.
2.	50MMF	High side to antenna terminal on antenna coil. Low side to B-. (Remove hank antenna)	1720KC	"	"	A3	Adjust for maximum output.
3.	50MMF	"	1400KC	Tune for max. output	"	A4	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

AIRCASTLE MODEL 9012W

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	12BE6	12BE6	7CH	
V2A	DET.-AVC-AF	12AV6	12AV6	7BT	
B	DET.-AVC-AF	12AT6	12AT6	7BT	
V3	Power Output	50B5	50B5	7BZ	
V4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	CL-10017	PRSA150/50-30			TA-530	Filter-Red
B	30	150						Filter-Blue
C2	.01	600	CP-12203	P688-01	D6-103		TM-11	AVC Filter-See Note
C3	.05	400	CP-12503	P488-05			72P51	Line Isolation
C4	250	500	CM-25251	1468-00025	D6-251	GP2K-250	1FM-325	Diode RF Filter
C5	.005	600	CP-12502	P688-005	D6-502	811-005	TM-25	Audio Coupling
C6	.005	600	CP-12502	P688-005	D6-502	811-005	TM-25	Audio Coupling
C7	.01	600	CP 14103	P688-01	D6-103		TM-11	Output Plate Bypass
C8	.05	200	CP-12503	P288-05			TM-15	Line Filter

Note. Some models use .02MFD in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	VC-12106-E	Q13-137		B-70-S	Volume control
B	Switch		Not Req.	76-1		Not Req.	Attach to R1A per instructions

RESISTORS

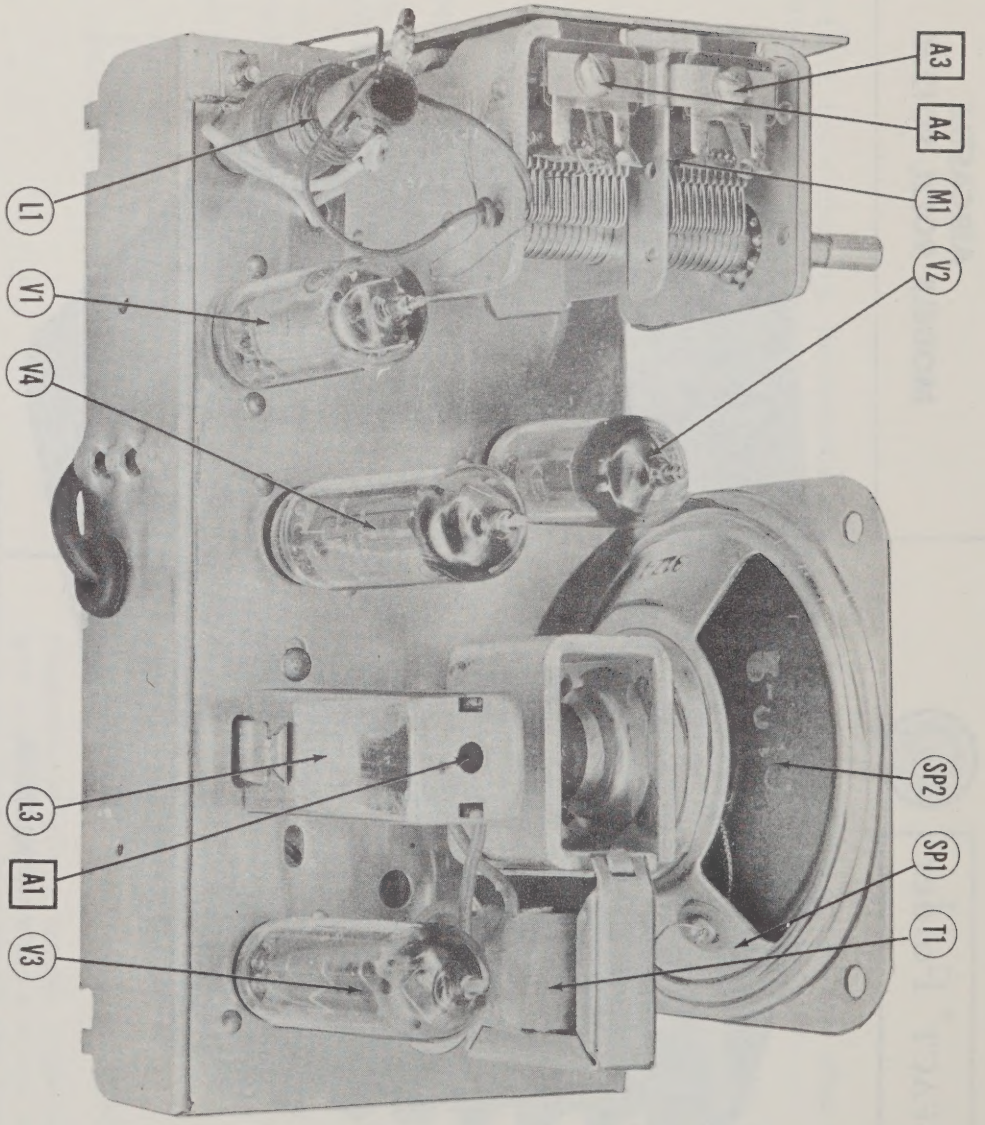
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	10KΩ	½	RC-31002	BTS-10K	Osc. Grid
R3	2.2 Meg.	½	RC-32204	BTS-2.2 Meg.	AVC Network
R4	10 Meg.	½	RC-31005	BTS-10 Meg.	AF Amp. Grid
R5	470KΩ	½	RC-34703	BTS-470K	AF Amp. Plate
R6	470KΩ	½	RC-34703	BTS-470K	Output Grid
R7	150Ω	½	RC-31500	BW-½-150	Output Cathode-See Note
R8	1000Ω	½	RC-31001	BTS-1000	Filter
R9	47Ω	1	RC-40470	BW-1-47	Filament Dropping
R10	22Ω	1	RC-40220		Rect. Ballast

Note. Not used in all models.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T1	26KΩ	3.3Ω	1.4KΩ	.4Ω	Part of SR-10007	A-3332 ¶	A-3025 ¶	RO-2 ¶	¶ Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA AIRCASTLE PART No.	VIKING PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.				
SP1	PM	3.3Ω	SR-10007	35J4 *	3A07 *	* Remount output transformer.
	CONE DIA.	V. C. DIA.				
SP2	3 3/8"	9/16"				

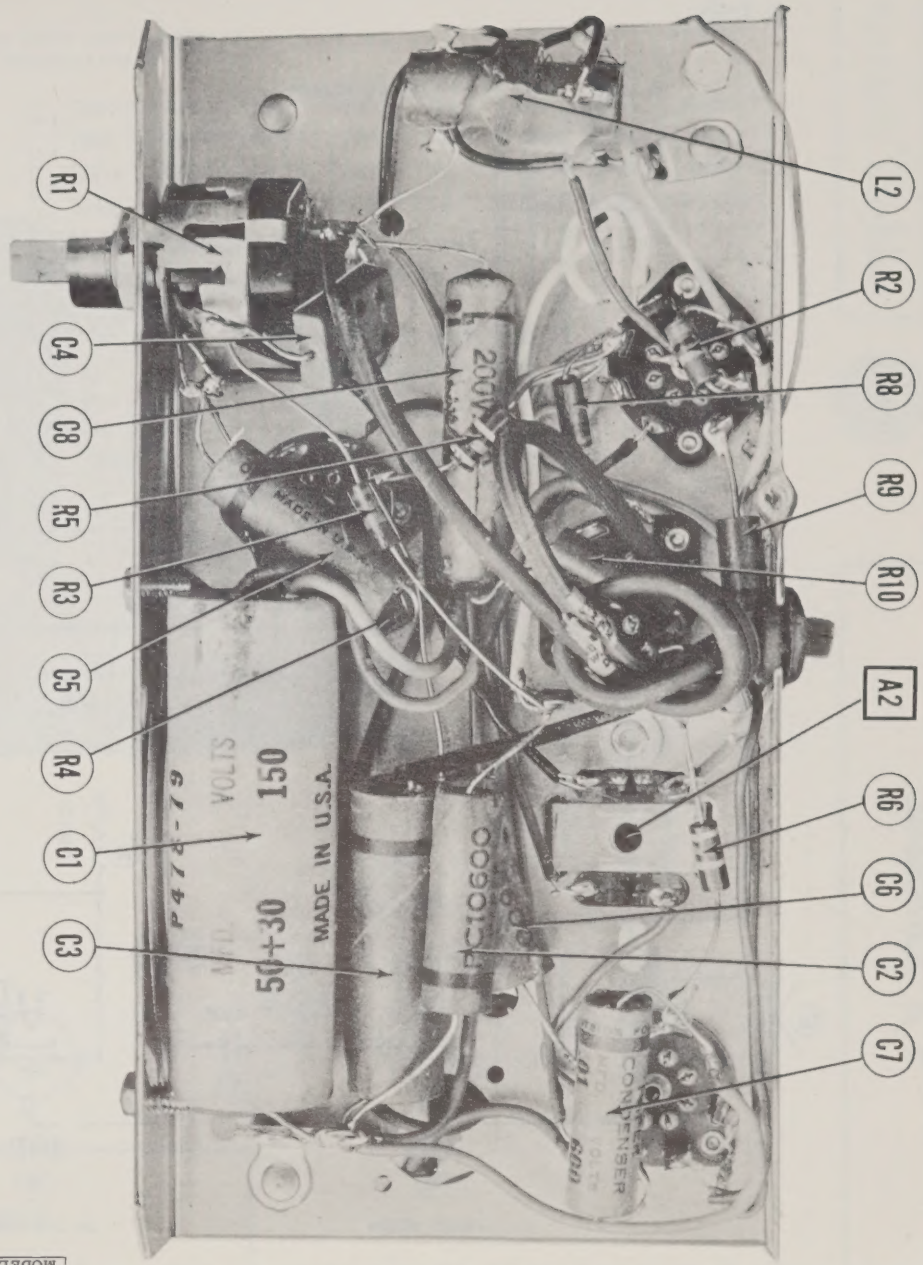
R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA AIRCASTLE PART No.	REPLACEMENT DATA MEISSNER PART No.
L1	Ant. Coil	36Ω	5Ω	TRF-10018	14-1071
L2	Osc. Coil	.8Ω	6Ω	TRC-10017	14-1073
L3	IF Trans.	19Ω	22Ω	TS-10039	16-6678

MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
M1	2 Gang Var. Cap.	CV-10018A	(35-477MMF, 27-213MMF)
	Dial Scale	DS-10112	
	Knob	K-10036W	Ivory or Walnut
	Pointer Knob	K-10042W	Ivory or Walnut

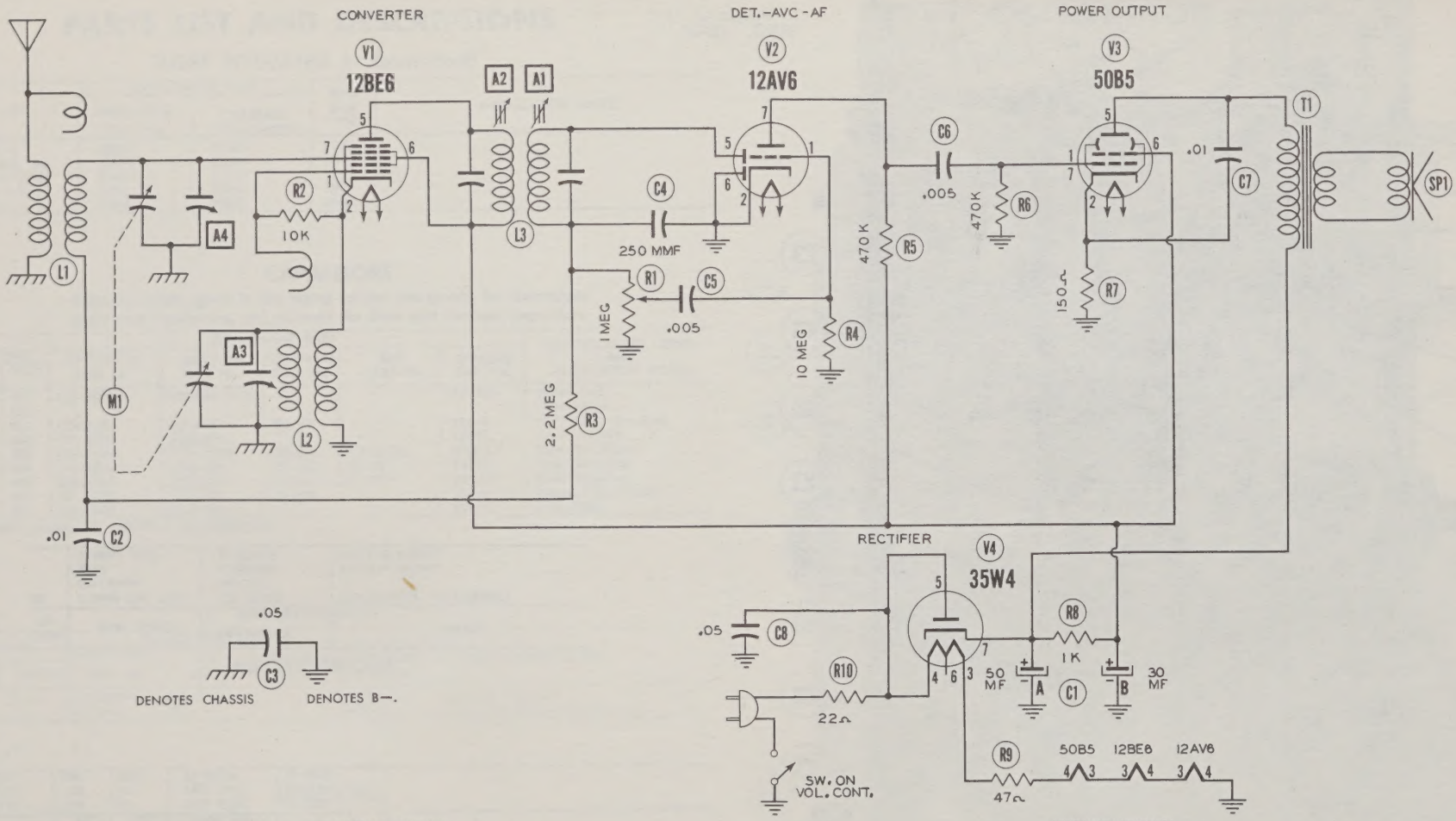
CHASSIS—BOTTOM VIEW



SET 94 FOLDER 1

AIRCASTLE MODEL 9012W

AIRCASTLE MODEL 9012W



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	§-7.4VDC	0V.	24VAC	12VAC	105VDC	105VDC	-.2VDC
V 2	12AV6	-.4VDC	0V.	12VAC	0V.	0V.	-.3VDC	55VDC
V 3	50B5	-1.8VDC	0V.	32VAC	80VAC	115VDC	105VDC	-1.8VDC
V 4	35W4	117VAC	32VAC	80VAC	112VAC	112VAC	105VAC	125VDC

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	10KΩ	.5Ω	24Ω	12Ω	†1KΩ	†1KΩ	3.3 Meg.
V 2	12AV6	10 Meg.	0Ω	12Ω	0Ω	0Ω	1 Meg.	†470KΩ
V 3	50B5	470KΩ	0Ω	75Ω	120Ω	†1.4KΩ	†1KΩ	470KΩ
V 4	35W4	170Ω	75Ω	120Ω	150Ω	150Ω	150Ω	500KΩ

† MEASURED FROM PIN 7 OF V4.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

94-1

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

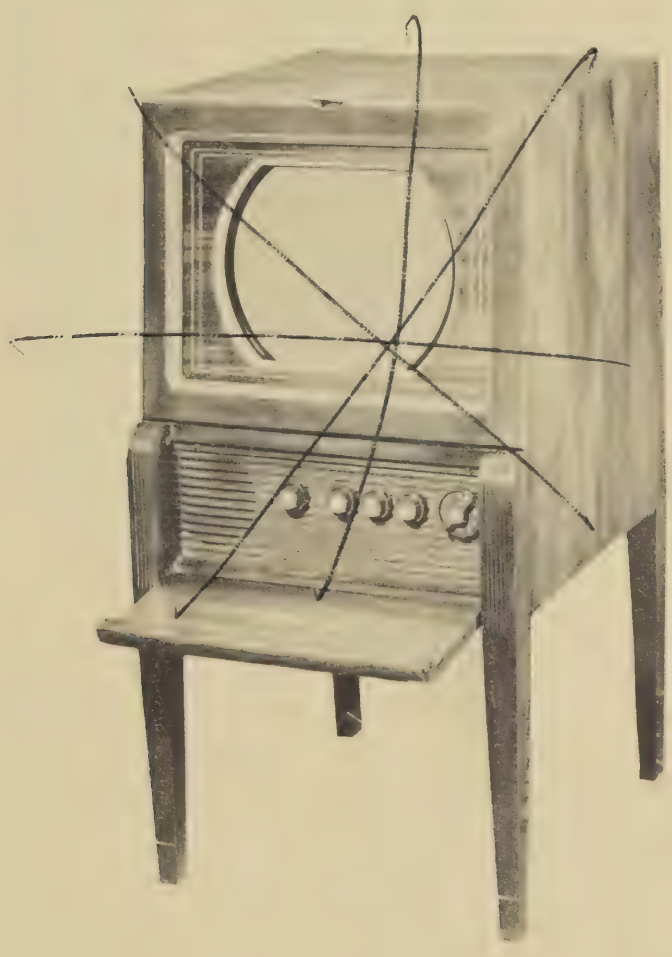
AIRLINE MODELS

84HA3010A, B, C

IMPORTANT FILING NOTICE

The contents for this envelope will be found among the last folders in this complete set of folders . . . *unless* it has been purchased as part of a *complete* volume of PHOTOFACTS assembled in a DeLuxe Binder.

Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



AIRLINE MODELS
84HA3010A, B, C

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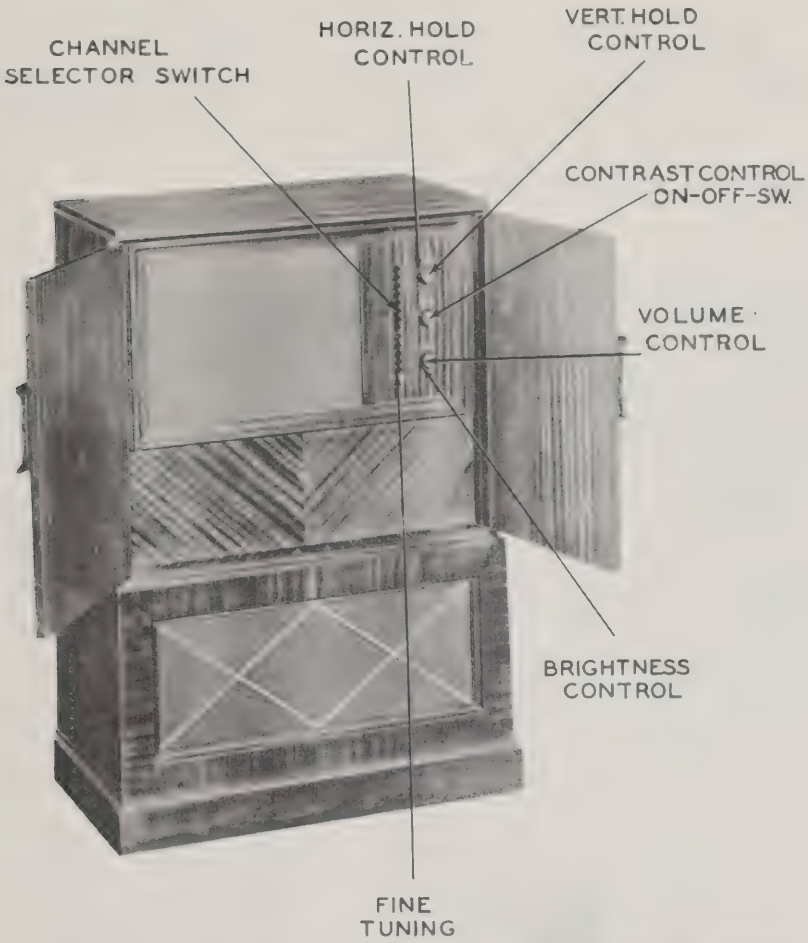
Date 5/50 Set No. 94—Folder No. 2

AIRLINE
MODELS 84HA3010A, B, C



AIRLINE
MODELS 84HA3010A, B, C

TRADE NAME	Airline, Models 84HA3010A, B, C
SUPPLIER	Montgomery Ward and Co., 619 Chicago, Ill.
TYPE SET	Projection Type Television Receiver
TUBES	Twenty Four

POWER SUPPLY 105 - 125 Volts AC - 60 Cycles RATING 2.01 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13

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Voltage and Resistance Measurements 14

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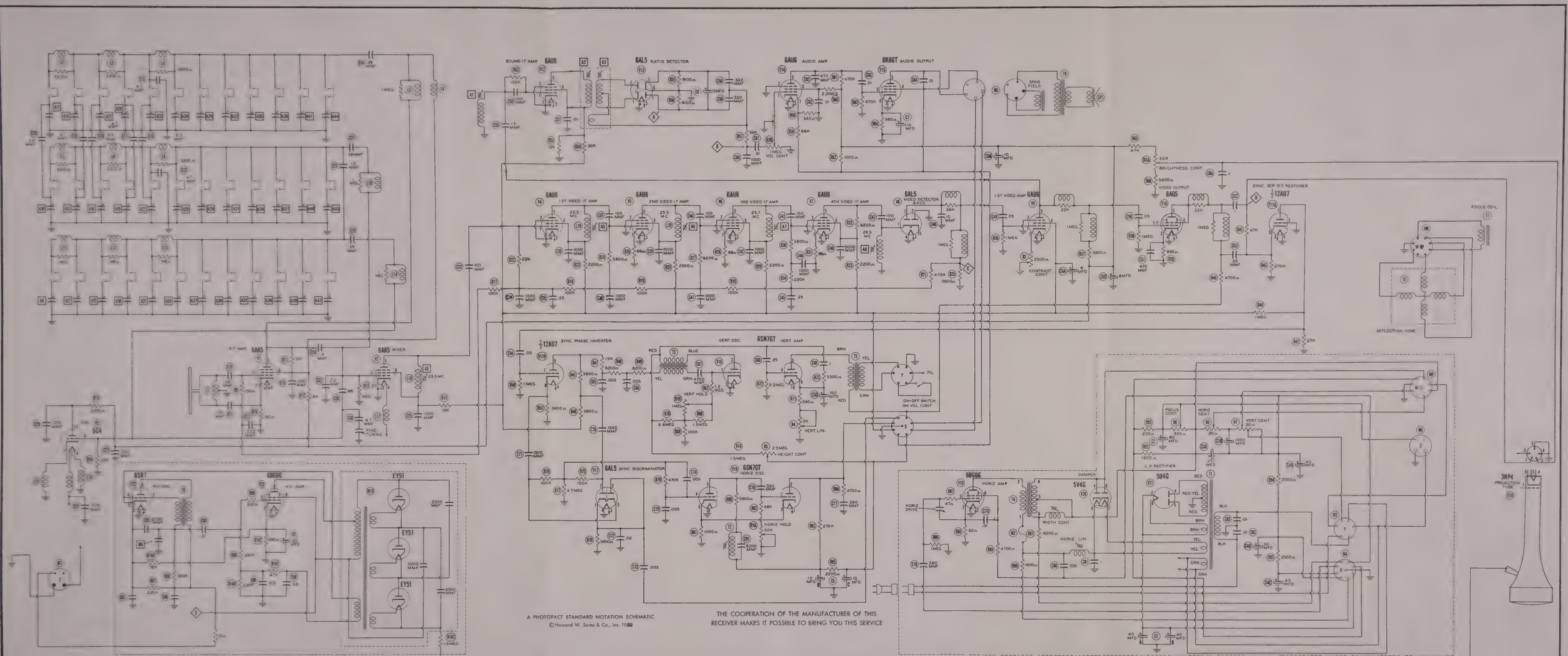

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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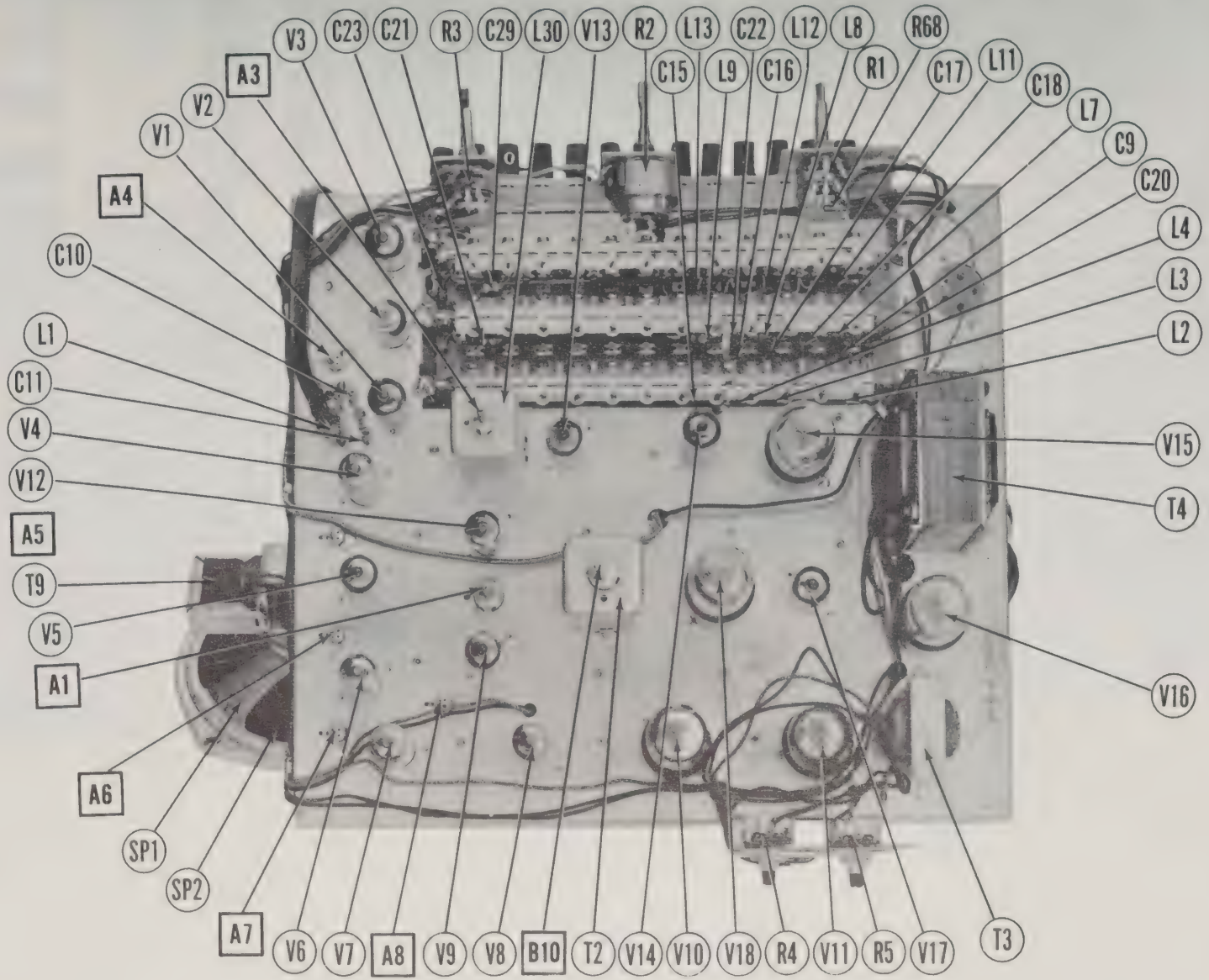
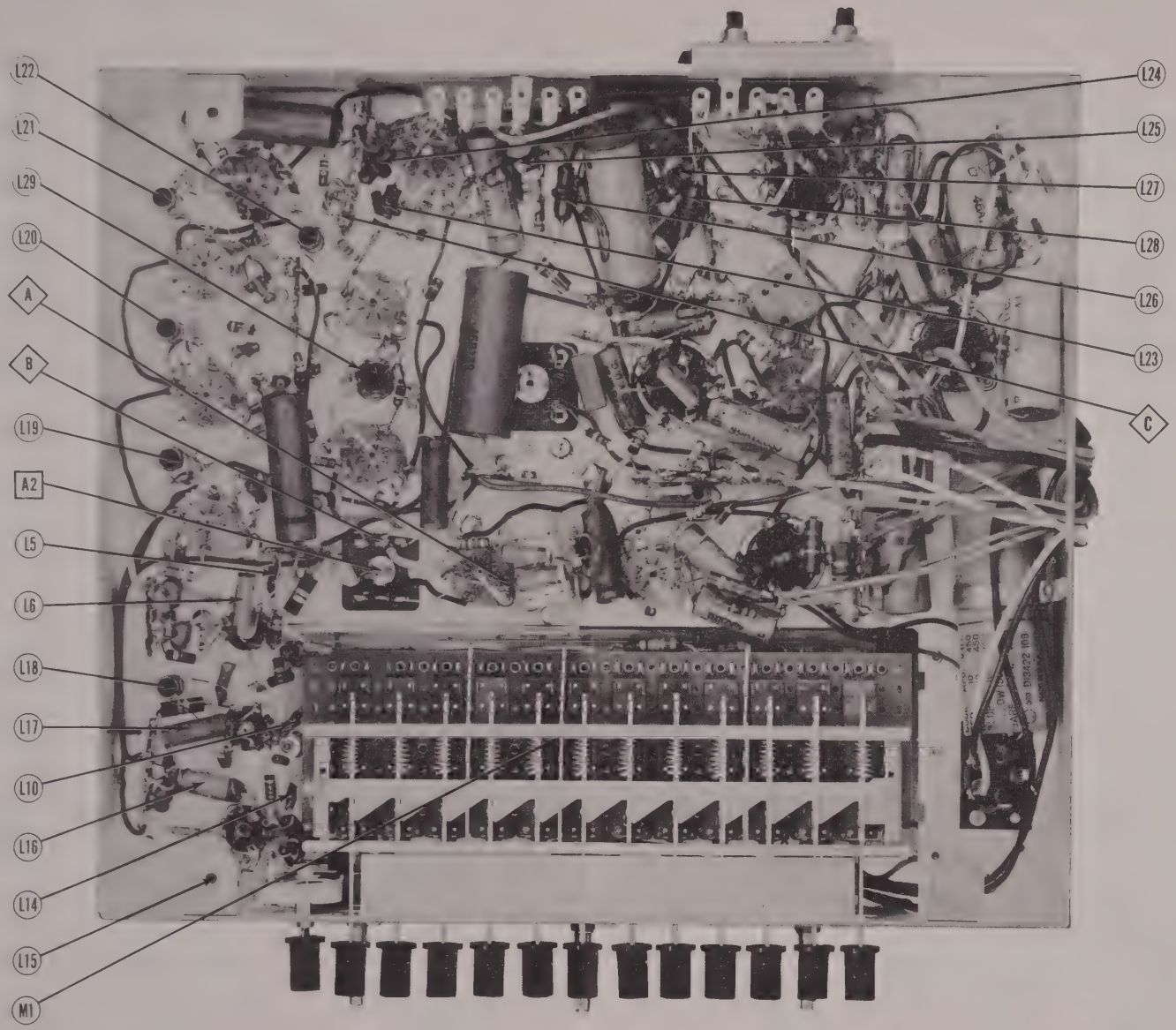
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

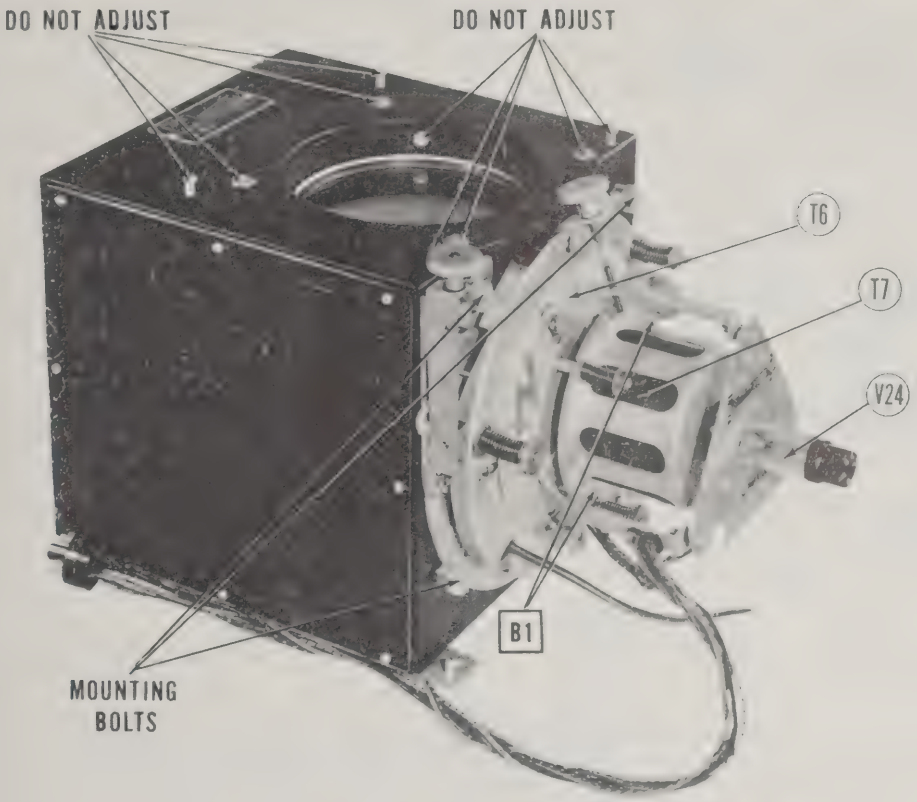
AIRLINE
MODELS 84HA3010A, B, C



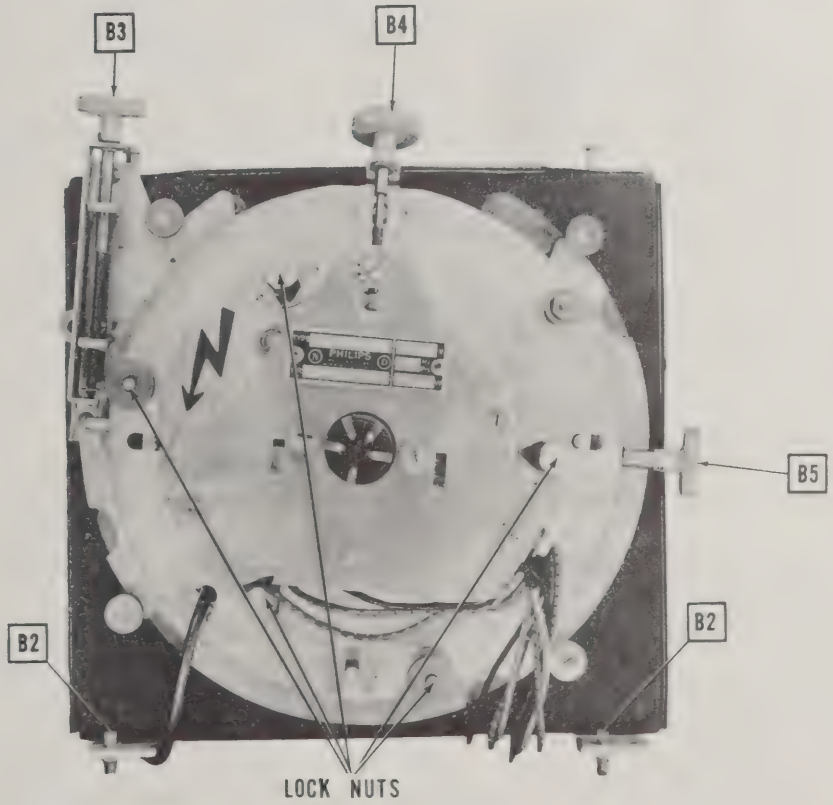
CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



PROJECTION UNIT



DEFLECTION AND FOCUS COIL ASSEMBLY

ALIGNMENT INSTRUCTIONS

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	5000MMF	High side to pin 1 (Grid) 6AU6 (V9). Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to pin 7 6AL5 (V13) point (A) Common lead to chassis.	A1, A2	Adjust for maximum deflection. Attenuate signal generator to give approximately 1 volt reading on VTVM.
2.	5000MMF	"	"	"	DC Probe to Point (B) Common to chassis.	A3	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

Shift the frequency of the signal generator either side of 4.5MC and slightly readjust A2 for approximately equal peaks. For best results, use only enough signal generator output to give one volt peaks. Retouch A3 for null point.

VIDEO IF ALIGNMENT

Remove oscillator tube V3 (6C4) before aligning the IF coils to prevent any possible spurious beats which might give improper alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	Two 150Ω carbon res.	Insert resistor in each generator lead and connect across antenna terminal.	26.2MC 25.5MC 23.5MC 23.0MC 22.2MC 26.2MC	2 " " " " "	DC Probe to point (C) Common to chassis.	A4 A5 A6 A7 A8 A4	Adjust the five IF coils at their listed frequencies for maximum deflection keeping signal generator level at such a point to maintain approximately a two volt reading on VTVM. Repeak A4 at 26.2MC with a signal generator attenuated to give 1 volt reading on VTVM.

Tune the signal generator from 21MC thru 26.25MC, attenuated to give a 1 1/2 volt reading on VTVM at the peaks. Plot IF Response curve. Check readings at 21.75MC, 26.25MC and the dip between peaks. See Figure 1 for correct response curve.

OVERALL IF RESPONSE CHECK

Connect synchronized sweep voltage from signal generator to horizontal amplifier in scope to obtain horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	5000MMF	High side to pin 1 (Grid) 6AK5 (V2). Low side to chassis.	24MC (10MC Sweep)	21.75MC 26.25MC	2	Vert. Amp. to Point (C) Low side to chassis.		If necessary, slightly retouch A4, A5, A6, A7 and A8 to obtain pattern similar to Figure 1. Check to see that markers fall at proper points.

RF ALIGNMENT

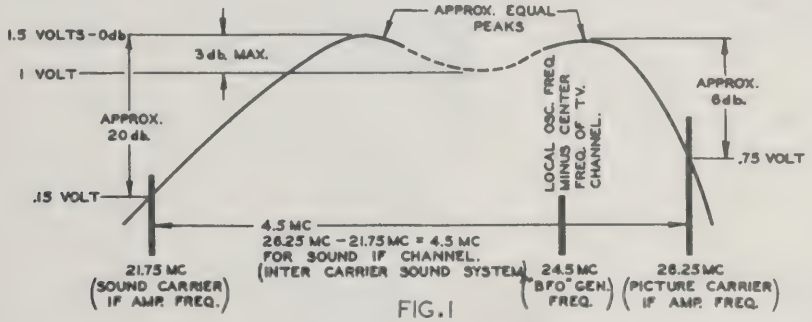
The local oscillator operates 24.5MC above the center frequency of each TV channel. To set the local oscillator a separate "BFO" generator set at 24.5MC is used to obtain a zero, beat with this difference frequency.

Couple the "BFO" generator to the receiver by connecting the output lead to a coil of hookup wire wrapped around the video detector tube (V8). Set the fine tuning control to the center of its capacity range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	BFO GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	Two 150Ω carbon res.	Across antenna terminals with 150Ω resistor in each generator lead.	57MC	24.5MC	2	DC Probe to point (C) Common to chassis.	A9	Connect .01MFD capacitor between pin 1 (Grid) of the 3NP4 picture tube (V24) and pin 1 (Grid) of 6AU6 audio amp. (V14). Adjust A9 for rough audio beat in speaker. Disconnect the .01MFD. capacitor.
6.	Two 150Ω carbon res.	"	"	Off	"	"	A10, A11	Adjust for maximum deflection.
7.	Two 150Ω carbon res.	"	63MC	24.5MC	3	"	A12	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
8.	Two 150Ω carbon res.	"	"	Off	"	"	A13, A14	Adjust for maximum deflection.
9.	Two 150Ω carbon res.	"	69MC	24.5MC	4	"	A15	Reconnect .01MFD capacitoras in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
10.	Two 150Ω carbon res.	"	"	Off	"	"	A16, A17	Adjust for maximum deflection.
11.	Two 150Ω carbon res.	"	79MC	24.5MC	5	"	A18	Reconnect .01MFD capacitors as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
12.	Two 150Ω carbon res.	"	"	Off	"	"	A19, A20	Adjust for maximum deflection.
13.	Two 150Ω carbon res.	"	85MC	24.5MC	6	"	A21	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
14.	Two 150Ω carbon res.	"	"	Off	"	"	A22, A23	Adjust for maximum deflection.
15.	Two 150Ω carbon res.	"	177MC	24.5MC	7	"	A24	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
16.	Two 150Ω carbon res.	"	"	Off	"	"	A25, A26	Adjust for maximum deflection.
17.	Two 150Ω carbon res.	"	183MC	24.5MC	8	"	A27	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
18.	Two 150Ω carbon res.	"	"	Off	"	"	A28, A29	Adjust for maximum deflection.

RF ALIGNMENT (CONT.)

19.	Two 150Ω carbon res.	"	189MC	24.5MC	9	"	A30	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
20.	Two 150Ω carbon res.	"	"	Off	"	"	A31, A32	Adjust for maximum deflection.
21.	Two 150Ω carbon res.	"	195MC	24.5MC	10	"	A33	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
22.	Two 150Ω carbon res.	"	"	Off	"	"	A34, A35	Adjust for maximum deflection.
23.	Two 150Ω carbon res.	"	201MC	24.5MC	11	"	A36	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
24.	Two 150Ω carbon res.	"	"	Off	"	"	A37, A38	Adjust for maximum deflection.
25.	Two 150Ω carbon res.	"	207MC	24.5MC	12	"	A39	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
26.	Two 150Ω carbon res.	"	"	Off	"	"	A40, A41	Adjust for maximum deflection.
27.	Two 150Ω carbon res.	"	213MC	24.5MC	13	"	A42	Reconnect .01MFD capacitor as in step 5 and adjust for rough audio beat. Remove .01MFD capacitor.
28.	Two 150Ω carbon res.	"	"	Off	"	"	A43, A44	Adjust for maximum deflection.


1.5 VOLTS-0db
1 VOLT
.15 VOLT
3db MAX.
APPROX. EQUAL PEAKS
APPROX. 20db.
APPROX. 6db.
.75 VOLT
LOCAL OSC. FREQ. MINUS CENTER FREQ. OF T.V. CHANNEL.
4.5 MC
26.25 MC - 21.75 MC = 4.5 MC FOR SOUND IF CHANNEL. (INTER CARRIER SOUND SYSTEM)
21.75 MC (SOUND CARRIER IF AMP. FREQ.)
24.5 MC BFO GEN. FREQ.
26.25 MC (PICTURE CARRIER IF AMP. FREQ.)
FIG. 1

HIGH VOLTAGE OSCILLATOR ADJUSTMENT

The blocking oscillator frequency in the high voltage supply should be maintained at 1000 ± 70 cycles. Unless a component that determines frequency has been altered or replaced, adjustment is not usually necessary. The frequency should be checked if the 6SR7 tube (V22) or any of the associated parts have been replaced.

The 1000 cycle adjustment controls the oscillator frequency which determines the filament supply of the three sealed rectifiers but has little effect on current regulation and voltage output.

Insert a 10Ω resistor in the B+ lead as shown on the schematic and connect the vertical amplifier of the scope between point E and the chassis. Feed a 1000 cycle signal from an audio generator to the horizontal sweep amplifier of the oscilloscope. Adjust B6 for a single stable Lissajous pattern as shown in figure 2.

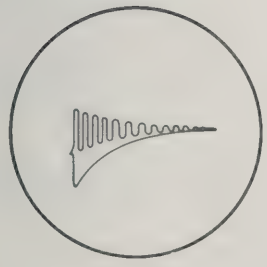


FIG. 2

Be sure to remove the 10Ω resistor after the adjustments is made.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENT

1. Turn the horizontal drive adjustment (B7) clockwise as far as possible without crowding the right hand side of the test pattern. Insufficient horizontal drive will result in the raster falling short of filling the mask horizontally.
2. Should the horizontal hold control fail to hold the test pattern, set this control to the middle of its rotation and adjust the horizontal oscillator adjustment (B10) for horizontal "sync".
3. Set the width (B9) and horizontal centering controls so test pattern fits and is centered in the mask horizontally.
4. Adjust the horizontal linearity slug (B8) so picture is symmetrical from left to right. Slight adjustment of B7 (Horizontal drive) may be necessary when making this adjustment.

ADJUSTMENT OF OPTICAL SYSTEM

This operation should be necessary only when replacing the 3NP4 or the focus and deflection coils.

Before turning on the set, turn both the contrast and brightness control full off. After about one minute slowly advance the controls for a medium bright raster. (If a spot or line appears on the screen, immediately turn brightness control full off and determine cause of sweep failure).

Adjust the focus control for the best possible focus on the face of the tube. This is necessary since no amount of mechanical focusing can correct a defocused image on the face of the tube.

Adjust the centering controls to center picture on the face of the tube. If mechanical centering is required in addition to the electrical centering, adjust the two centering screws B1. While adjusting these screws, be careful not to force the focus coil against the neck of the tube by tilting it excessively in either direction. With the raster centered on the face of the tube the image should be centered on the viewing screen. Many test patterns have wedges or arrows which indicate the edges of the picture. If a pattern having these marks is being received, they can be used for checking the centering. If picture is not properly centered on the viewing screen loosen the three mounting bolts of the projection unit and adjust the three leveling screws B2 to center the pattern on the viewing screen.

If the pattern tilts on the screen, loosen the four mounting bolts and rotate the mounting assembly slightly as required. Tighten the mounting bolts .

Check to see that the pattern is still in sharp focus on the face of the tube. The picture should also be in focus on the viewing screen. If it is not, loosen the five locking nuts about one turn each. Adjust the overall focusing adjustment B3 to focus the center of the picture. Adjust the horizontal focusing adjustment B4 for equal focus in the areas on each side of the center. Adjust the vertical focusing adjustment B5 for equal focus above and below the center. After each adjustment of B4 and B5 check the overall focus adjustment B3. By careful adjustment of B3, B4 and B5, the entire pattern can be brought into focus. After completing the adjustments tighten the five locking nuts.

CAUTION- The screws on top of the projection unit are adjustments for the optical system inside the unit and under no circumstances should they be disturbed. These adjustments or replacement of the optical parts must be done at the factory.

CARE OF THE OPTICAL SYSTEM

CARE OF THE OPTICAL SYSTEM

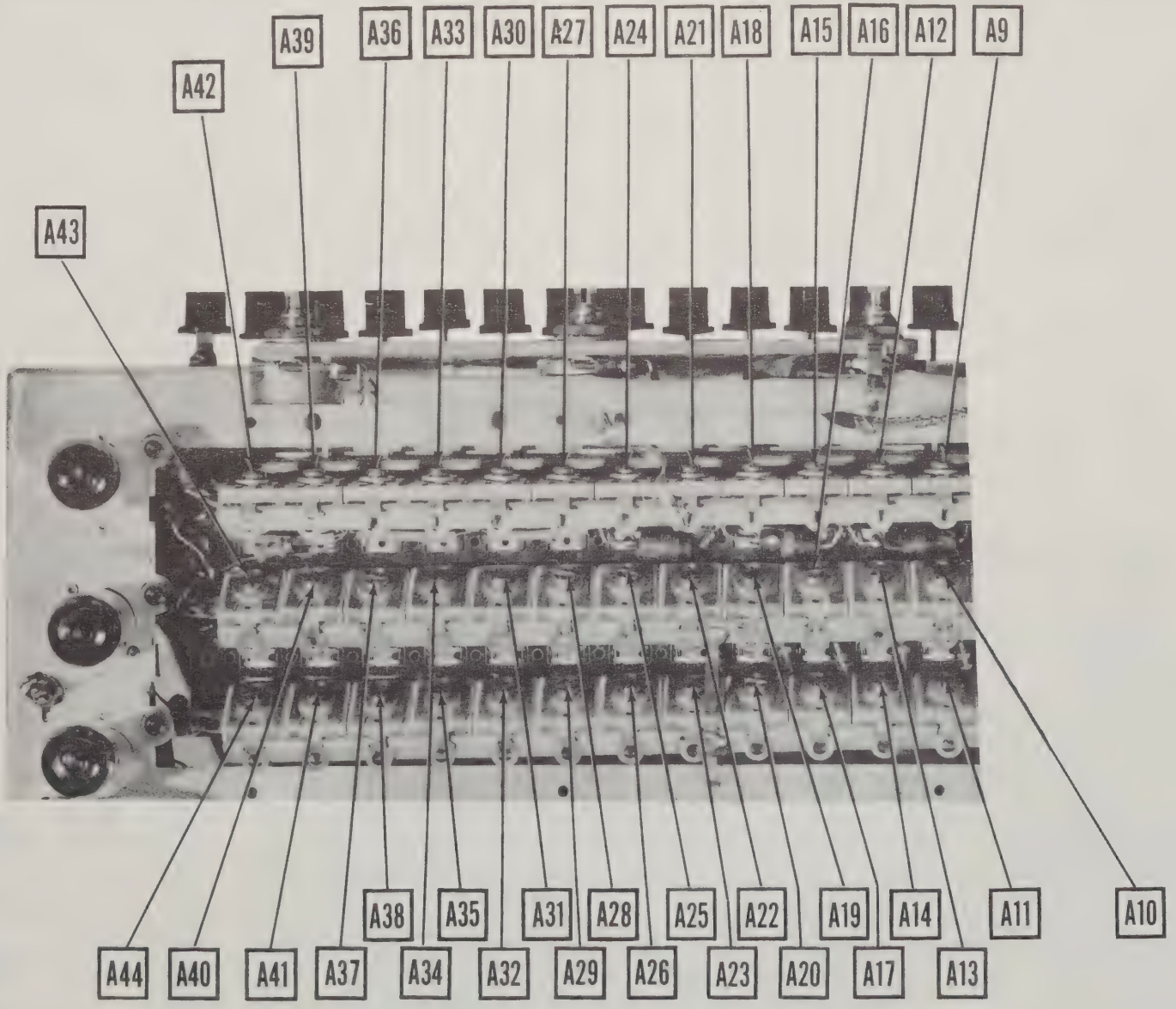
The optical components of a projection type of television receiver must remain free of dust and film to retain the orignal picture brilliance. The components of this optical system that will require occasional cleaning are the viewing screen, diagonal mirror, and top face of the projection unit window.

Loose dust may be safely removed with a camel hair brush.. The diagonal mirror and viewing screen may be cleaned of film by any normal glass cleaning procedure provided abrasives are avoided. Cleaning with absorbent cotton and a clean, soft cloth is satisfactory. Avoid the use of cleaning powders abrasive soaps and similar abrasives. Freshly laundered soft cloths should be used to avoid abrading the surface of the optical system. Use water or other cleaning liquids sparingly on the window of the projection unit to avoid getting the moisture inside the unit.

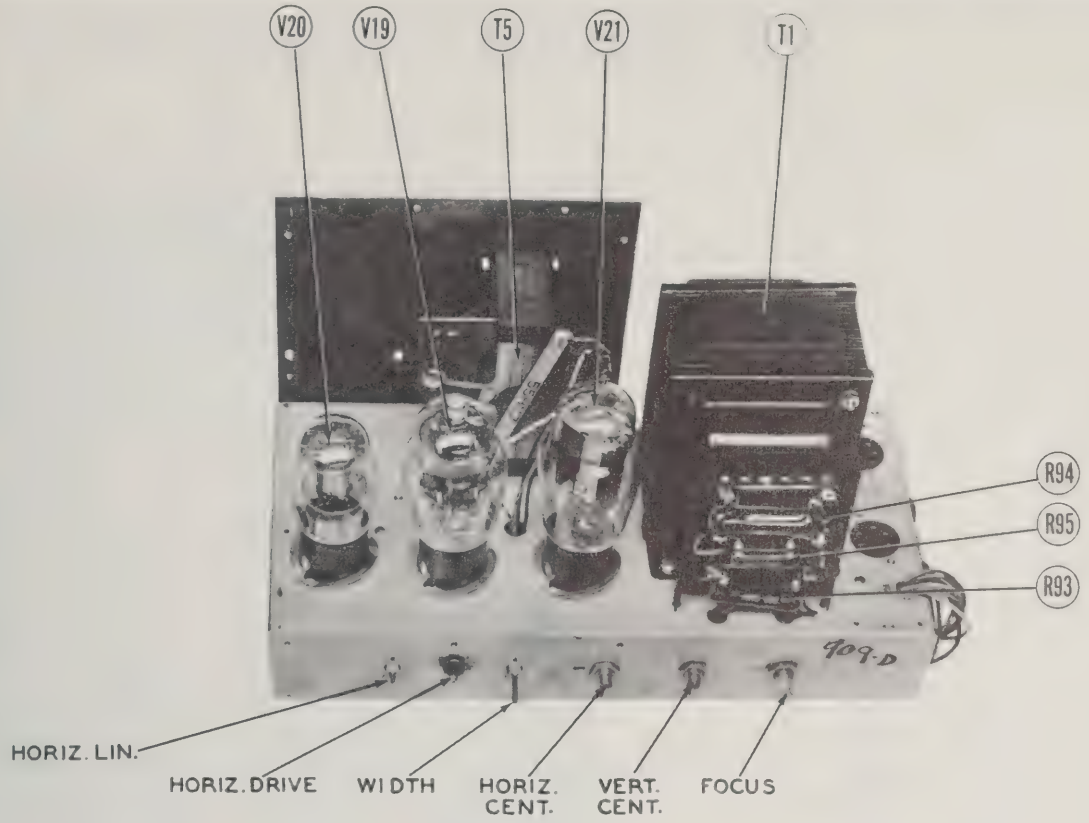
The optical components inside the projection unit are well protected, hence rarely require cleaning. Where it is essential to clean an optical surface inside the projection unit, the side plate may be removed to gain access to the optical surfaces.

Loose dust may be removed with a jet of clean dry air and a camel hair brush. Film on the optical surfaces may be removed with lens tissue and commercial cleaning solutions prepared especially for optical surfaces. These are available at most photographic supply houses. When cleaning the optical components inside the housing, also include the face of the projection tube. The face of the tube is an optical surface and must be cleaned with the same care given the concave mirror and diagonal mirror.

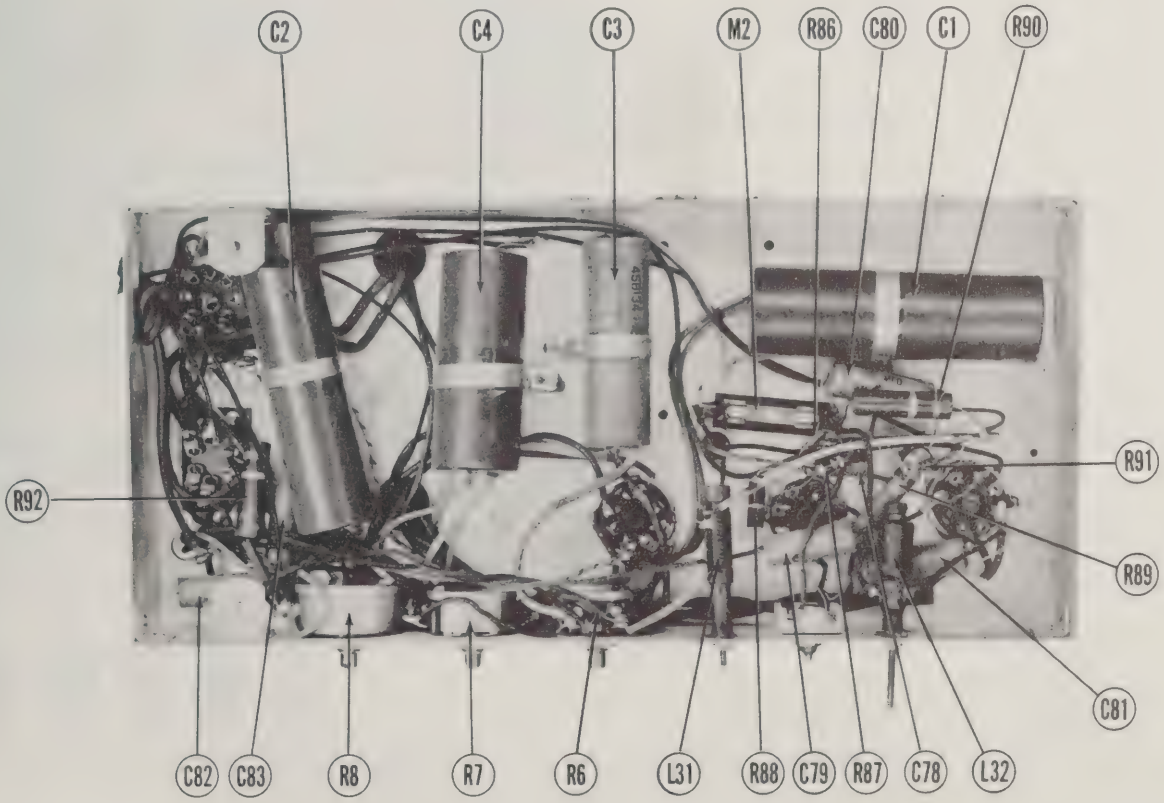
CAUTION: Do not loosen or remove the mounting screws or adjustment screws of the optical system inside the projection unit or remove the corrector lens or change its adjustment in any way. There is no simple way of adjusting this part of the optical system without special equipment.



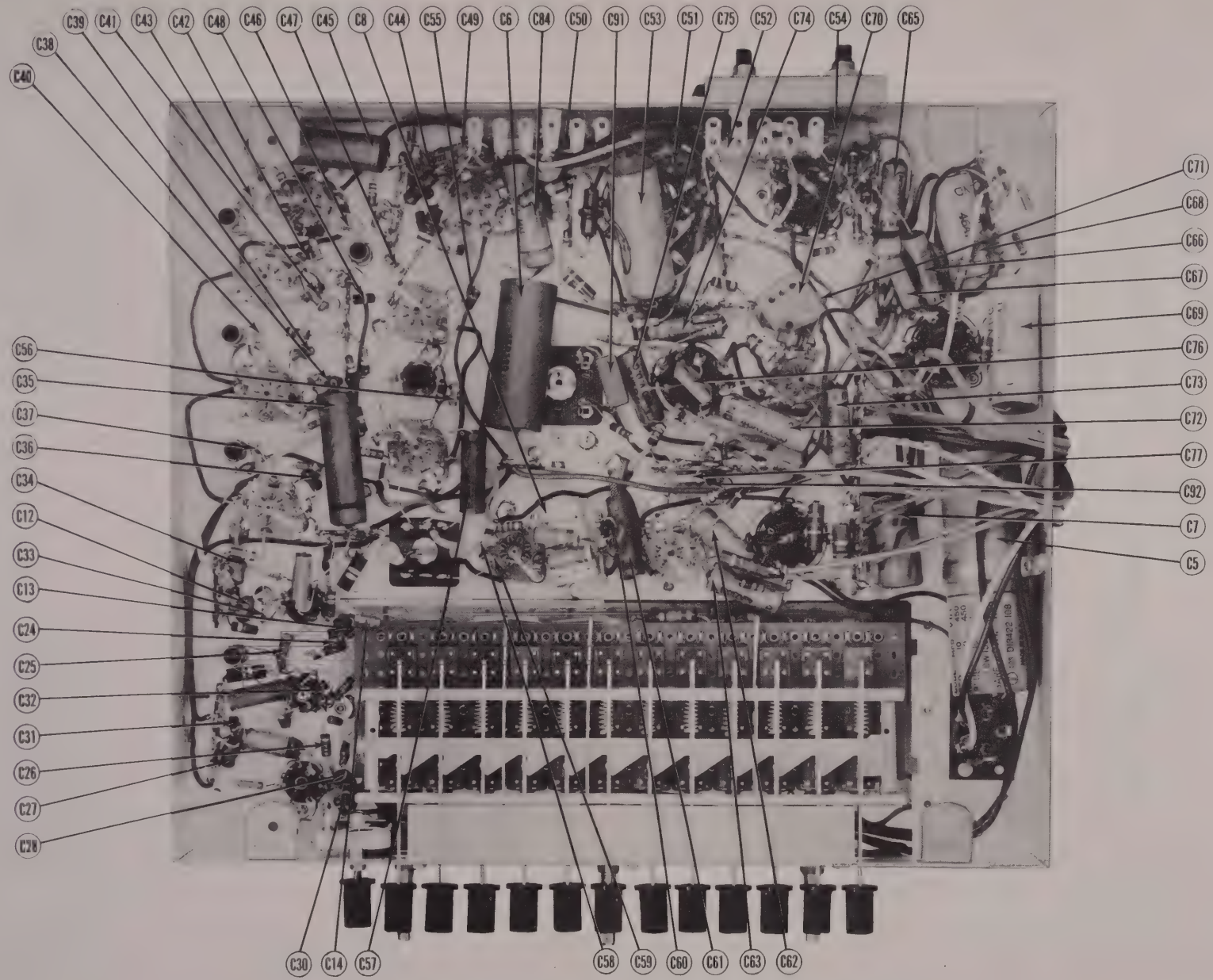
RF ALIGNMENT POINTS



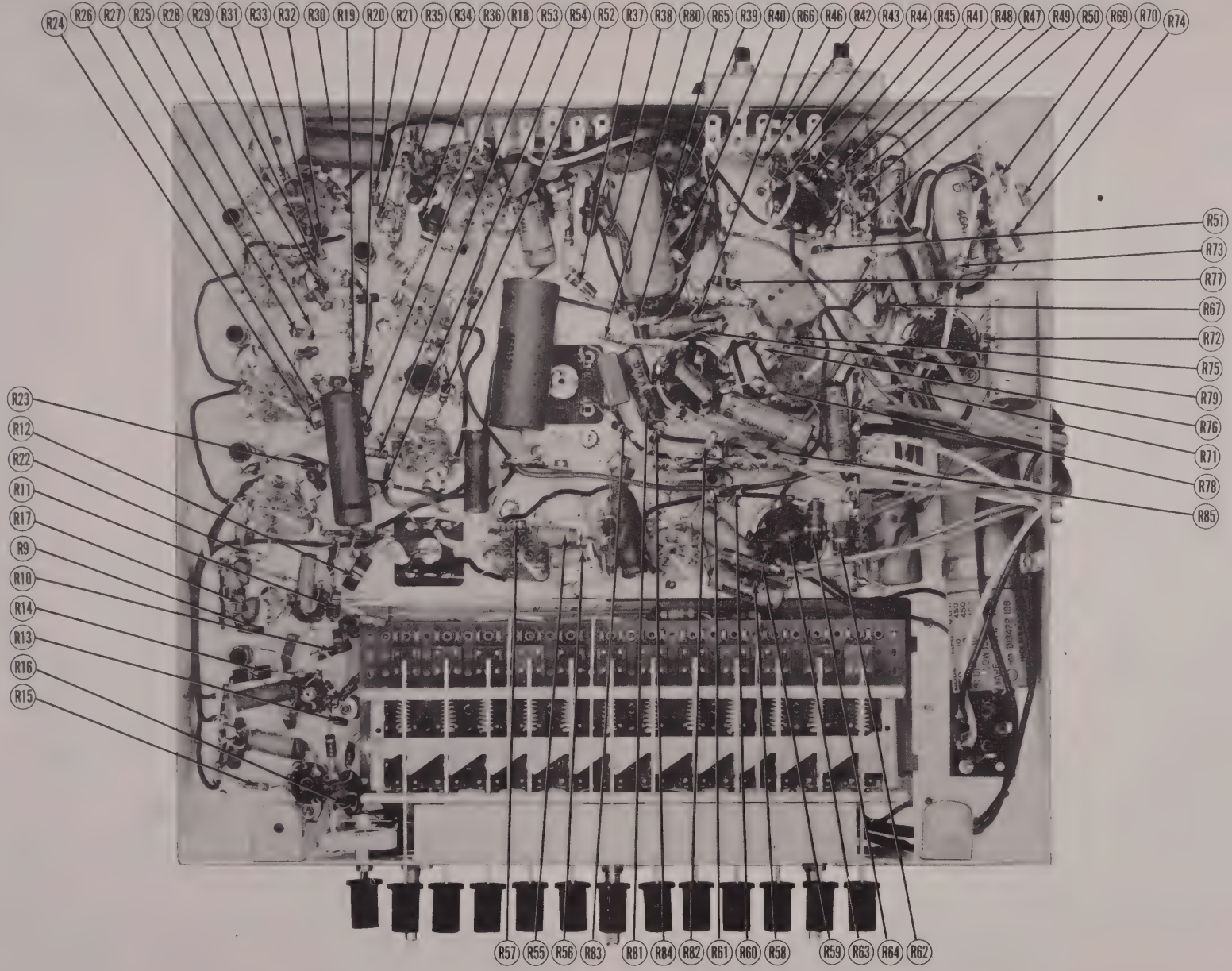
POWER SUPPLY CHASSIS-TOP VIEW



POWER SUPPLY CHASSIS-BOTTOM VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
V 1	6AK5	-.7VDC	.6VDC	6.3VAC	0V	110VDC	110VDC	.6VDC		
V 2	6AK5	-1VDC	0V	0V	6.3VAC	70VDC	70VDC	0V		
V 3	6C4	150VDC	0V	0V	6.3VAC	150VDC	$-3.8VDC	0V		
V 4	6AU6	-.9VDC	0V	6.3VAC	0V	110VDC	110VDC	0V		
V 5	6AU6	-.6VDC	0V	6.3VAC	0V	110VDC	110VDC	.3VDC		
V 6	6AU6	-.5VDC	0V	6.3VAC	0V	110VDC	110VDC	.3VDC		
V 7	6AU6	-.3VDC	0V	6.3VAC	0V	85VDC	110VDC	.4VDC		
V 8	6AL5	0V	0V	6.3VAC	0V	.6VDC	0V	-1VDC		
V 9	6AU6	0V	0V	6.3VAC	0V	175VDC	120VDC	3VDC		
V 10	6V6GT	0V	0V	235VDC	235VDC	0V	0V	6.3VAC	17VDC	
V 11	6SN7GT	0V	2VDC	.8VDC	0V	110VDC	4.8VDC	6.3VAC	0V	
V 12	6AU6	-.5VDC	0V	6.3VAC	0V	26VDC	26VDC	0V		
V 13	6AL5	.1VDC	.1VDC	6.3VAC	0V	.2VDC	0V	-.2VDC		
V 14	6AU6	0V	0V	6.3VAC	0V	75VDC	15VDC	1VDC		
V 15	6K6GT	0V	0V	195VDC	200VDC	0V	0V	6.3VAC	13.5VDC	
V 16	6SN7GT	-3.4VDC	60VDC 130VDC	0V	0V	335VDC	8.8VDC 16VDC	6.3VAC	0V	
V 17	6AL5	0V	0V	6.3VAC	0V	1VDC	0V	-.7VDC		
V 18	6SN7GT	-4.8VDC	120VDC	11VDC	0V	320VDC	11VDC	6.3VAC	0V	
V 19	6BG6G	0V	6.3VAC	8VDC	0V	-.9VDC	0V	0V	290VDC	‡
V 20	5V4G	0V	420VDC	0V	350VDC	0V	350VDC	0V	420VDC	
V 21	5U4G	0V	400VDC	0V	380VAC	0V	380VAC	0V	400VDC	
V 22	6SR7	0V	-55VDC	80VDC	-125VDC	-125VDC	340VDC	6.3VAC	0V	
V 23	6BG6G	-100VDC	6.3VAC	11VDC	-104VDC	-100VDC	-125VDC	0V	340VDC	‡
V 24	3NP4	.6VDC	6.3VAC	0V	0V	95VDC				

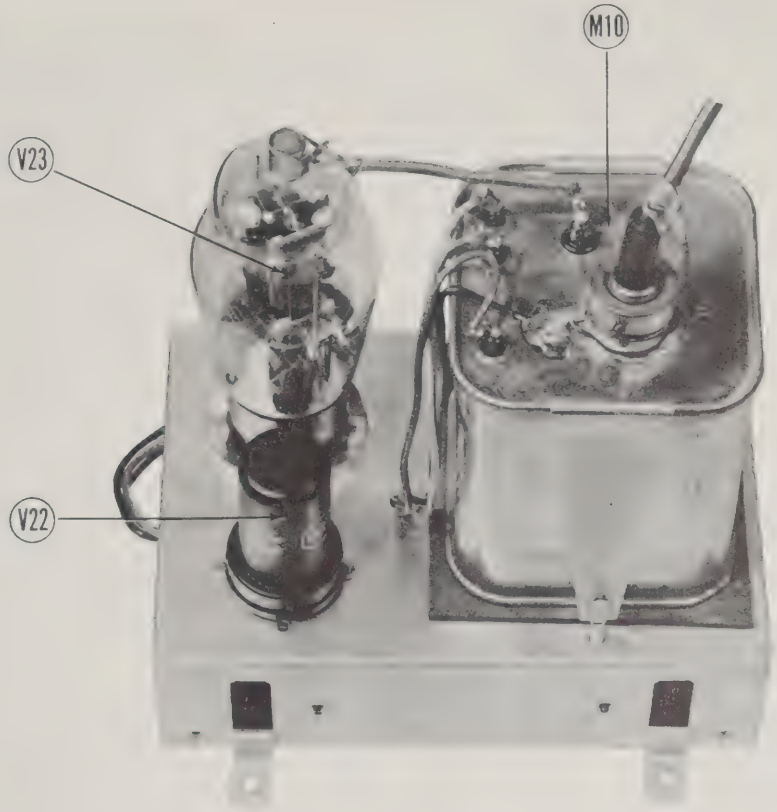
‡ Do not measure

RESISTANCE READINGS

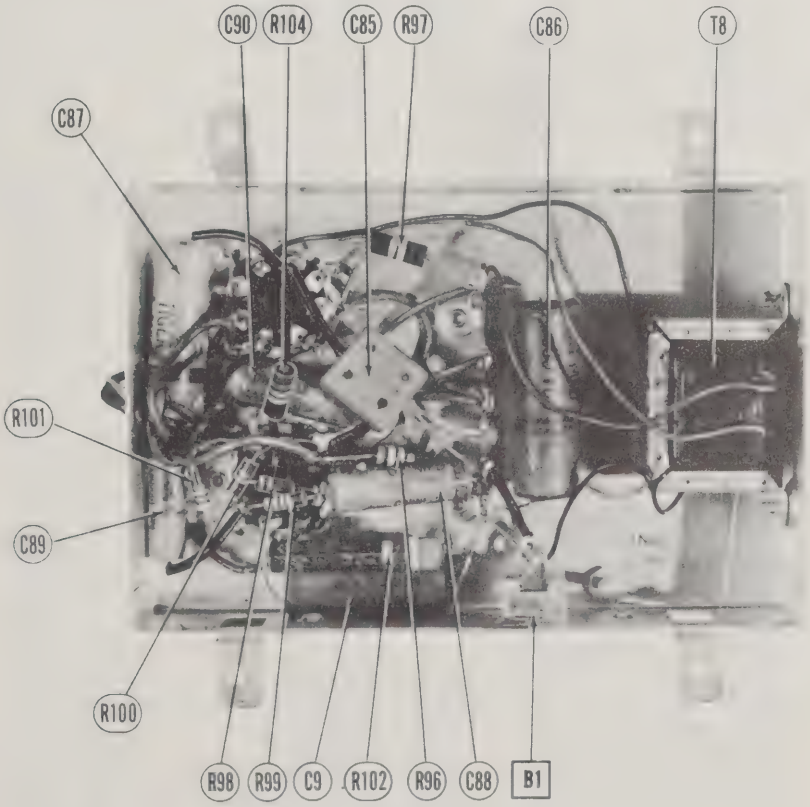
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
V 1	6AK5	850KΩ	150Ω	.2Ω	0Ω	*18KΩ	*18KΩ	150Ω		
V 2	6AK5	1 Meg.	0Ω	0Ω	.2Ω	*15KΩ	*15KΩ	0Ω		
V 3	6C4	*5KΩ	Inf.	.1Ω	.2Ω	*5KΩ	22KΩ	2Ω		
V 4	6AU6	750KΩ	0Ω	.2Ω	0Ω	*6.5KΩ	*6.5KΩ	0Ω		
V 5	6AU6	650KΩ	0Ω	.2Ω	0Ω	*6.5KΩ	*6.5KΩ	68Ω		
V 6	6AU6	550KΩ	0Ω	.2Ω	0Ω	*6.5KΩ	*6.5KΩ	68Ω		
V 7	6AU6	700KΩ	0Ω	.2Ω	0Ω	*14KΩ	*6.5KΩ	68Ω		
V 8	6AL5	.1Ω	0Ω	.2Ω	0Ω	Inf.	0Ω	6KΩ		
V 9	6AU6	1 Meg.	0Ω	.2Ω	0Ω	*6KΩ	*4.5KΩ	2.5KΩ		
V 10	6V6GT	Inf.	0Ω	*5KΩ	*5KΩ	1 Meg.	Inf.	.2Ω	680Ω	
V 11	6SN7GT	0Ω	*44KΩ	270KΩ	1 Meg.	*13KΩ	3.9KΩ	.2Ω	0Ω	
V 12	6AU6	150KΩ	0Ω	.2Ω	0Ω	*20KΩ	*20KΩ	0Ω		
V 13	6AL5	Inf.	Inf.	.2Ω	0Ω	9KΩ	0Ω	9KΩ		
V 14	6AU6	0Ω	0Ω	.2Ω	0Ω	*470KΩ	*2.2Meg.	300Ω		
V 15	6K6GT	0Ω	0Ω	*2.5KΩ	*2KΩ	470KΩ	Inf.	.2Ω	680Ω	
V 16	6SN7GT	1.8 Meg.	†2.8 Meg †1.2 Meg	0Ω	2.2Meg.	*100ΩΩ	5.5KΩ 540Ω	.2Ω	0Ω	
V 17	6AL5	5.6KΩ	5.6KΩ	.2Ω	0Ω	4.7 Meg.	0Ω	4.7Meg.		
V 18	6SN7GT	110KΩ	†270KΩ	1000Ω	5 Meg.	†9KΩ	1000Ω	.2Ω	0Ω	
V 19	6BG6G	Inf.	.2Ω	82Ω	Inf.	1 Meg.	Inf.	0Ω	*5KΩ	†150Ω
V 20	5V4G	Inf.	†0Ω	Inf.	*240Ω	Inf.	*240Ω	Inf.	†0Ω	
V 21	5U4G	Inf.	20KΩ	Inf.	32Ω	Inf.	30Ω	Inf.	20KΩ	
V 22	6SR7	0Ω	400KΩ	16KΩ	250KΩ	250KΩ	*350Ω	.2Ω	0Ω	
V 23	6BG6G	540KΩ	.2Ω	350Ω	240KΩ	560KΩ	260KΩ	0Ω	*200Ω	*480Ω
V 24	3NP4	340KΩ	.2Ω	0Ω	0Ω	30KΩ				

* Measured from pin 2 of V21
† Measured from pin 8 of V20

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



HIGH VOLTAGE SUPPLY-TOP VIEW



HIGH VOLTAGE SUPPLY-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIR LINE PART No	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1A	RF Amp.		6AK5	7BD	
B	RF Amp.		6AG5	7BD	
V2A	Mixer		6AK5	7BD	
B	Mixer		6AG5	7BD	
V3	Oscillator		6C4	6BG	
V4	1st IF Amp.		6AU6	7BK	
V5	2nd IF Amp.		6AU6	7BK	
V6	3rd IF Amp.		6AU6	7BK	
V7	4th IF Amp.		6AU6	7BK	
V8	Video Det.-AGC		6AL5	6BT	
V9	Video Amp.		6AU6	7BK	
V10A	Video Output		6V6GT	7AC	
B	Video Output		6AQ5	7BZ	
V11A	DC Res.-Sync.Sep. -Sync Phase Inv.		6SN7GT	8BD	
B	DC Rest -Sync.Sep. -Sync Phase Inv.		12AU7	9A	
V12	Sound IF		6AU6	7BK	
V13	Ratio Det		6AL5	6BT	
V14	AF Amp		6AU6	7BK	
V15	Audio Output		6K6GT	7S	
V16	Vert. Osc -Vert. Amp		6SN7GT	8BD	
V17	Hor Sync Disc		6AL5	6BT	
V18	Hor Osc		6SN7GT	8BD	
V19	Hor Output		6BG6G	5BT	
V20	Damper		5V4G	5L	
V21	LV Rectifier		5U4G	5T	
V22	HV Oscillator		6SR7	9Q	
V23	HV Amp		6BG6G	5BT	
V24	Projection Tube		3NP4		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING: CAP	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No	REPLACEMENT DATA: AEROVOX PART No	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No	REPLACEMENT DATA: SPRAGUE PART No	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	45B137	PRSA475-40-40			TVL-64 †	Filter-Red
B	40	450						Filter-Red
C2	80	450	45B136	PRSA475-80			TVL-9 †	Filter
C3A	250	10	45B134	PRS\2-250			TVL-66 †	Hor. Cent. Cont. Bypass
B	1000	6		PRS\8-1000				Vert Cent Cont. Bypass
C4A	40	350	45B138	PRSA8D8H6F			TVL-54 †	Filter-Red
B	30	250						Filter-Yellow
C	40	150						Filter-Blue
C5A	10	450	45B135	PRSA475-10-10 -10-50-150			D13422	Filter-Blue
B	10	450						Filter-Red
C	10	450						Filter-Red
D	150	50						Vert. Amp. Cath. Byp. Yellow
C6A	8	300	45B139	PRS450-8-8			TVA-25	Filter
B	8	300						Filter
C7	10	25	45A121	PRS25-10			TVA-5	Output Cathode Bypass
C8	5	50	45A109	PRS\50-5			TVA-13	Stabilizing Cap.
C9	20	50	45A089	PRS\50-25			TVA-15	HV Amp. Cath. Bypass
C10	100		47B2000K5	GP100M	D6-101	GP1K-100	1FM-31	RF Coupling
C11	100		47B2000K5	GP100M	D6-101	GP1K-100	1FM-31	RF Coupling
C12	1000		47B20A402N1	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C13	1000		47B20A102M1	GP1000M	D6-102	GP2L-001	1FM-21	RF Decoupling
C14	39		47B2039OK5	GP39M	D6-390	GP1K-39	1FM-44	RF Coupling
C15	4.7		47A160-6	CM4.7DNPO	D2-4.7	NPOK-4.7		Fixed Padder
C16	2.2		47A160-4		D2-2.2			RF Coupling
C17	4.7		47A160-6	CM4.7DNPO	D2-4.7	NPOK-4.7		RF Coupling
C18	3.3		47A160-5	CN3.3CNPO	D2-3.3	NPOK-3.3		RF Coupling
C19	4.7		47A160-6	CM4.7DNPO	D2-4.7	NPOK-4.7		RF Coupling
C20	3.3		47A160-5	CN3.3CNPO	D2-3.3	NPOK-3.3		RF Coupling
C21	39		47B20390K5	GP39M	D6-390	GP1K-39	1FM-44	RF Coupling
C22	4.7		47A160-6	CM4.7DNPO	D2-4.7	NPOK-4.7		Fixed Padder
C23	2.5		47A160-3	CN2.5CNPO	D2-2.5	NPOK-2.5		Osc. Coupling
C24	1.5		47A160-3	CN1.5CNPO	D2-1.5	NPOK-1.5		RF Coupling
C25	1000		47B20A102M1	GP1000M	D6-102	GP2L-001	1FM-21	Mixer Decoupling
C26	.68		47A160-1		D2-.68			Osc. Coupling
C27	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	RF Bypass
C28	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	Osc. Plate Bypass
C29	39		47B2039OK5	GP39M	D6-390	GP1K-39	1FM-44	Osc. Grid Cap.
C30	4.7		47A160-6	CM4.7DNPO	D2-4.7	NPOK-4.7		Fixed Padder
C31	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	Osc. Filament Bypass
C32	2.2		47A160-4		D2-2.2			Fixed Trimmer *
C33	100		47B2010K5	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C34	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C35	25	200	46AT254J	P488-25			TC-2	AGC Filter
C36	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	1st IF Decoupling
C37	100		47B2000K5	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C38	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C39	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	2nd IF Decoupling
C40	100		47B2010K5	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C41	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C42	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	3rd IF Decoupling
C43	100		47B2010K5	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C44	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C45	.25	200	45AT254J	P488-25			TC-2	AGC Filter
C46	5000		47A168	BPD-5	D6-502	811-005	29C1	4th IF Decoupling
C47	100		47B2010K5	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C48	10		47A160-11	GP10K	D6-100	GP1K-10	MS-41	Diode Filter
C49	.05	200	46AU503J	P288-05			TM-15	Video Coupling
C50	.05	600	46AY503J	P688-05			TM-15	Video Coupling
C51	470	500		1468-0005	D6-501	GP2K-500	1FM-35	2nd V. Amp. Cath. Bypass
C52	.1	600	46AY104J	P688-1			TM-1	Video Coupling
C53	.25	600	46AX254J	684-25			TC-2	Video Coupling
C54	.05	600	46AY503J	P688-05			TM-15	Sync. Coupling
C55	1.5		47A160-3	CN1.5CNPO	D2-1.5	NPOK-1.5		S. IF Coupling
C56	100		47B2010K5	GP100M	D6-101	GP1K-100	1FM-31	S. IF Coupling
C57	.01	400	46A103J	P488-01	D6-103	811-01	TM-11	S. IF Decoupling
C58	330		47B20331K5	GP331M	D6-331	GP2K-330	1FM-335	Diode Load Cap. †

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C59	330		47B20331K5	GP331M	D6-331	GP2K-330	1FM-335	Diode Load Cap. †
C60	1000		47B20A102N1	GP1000M	D6-102	GP2L-001	1FM-21	De-emphasis
C61	.01	400	46AU103J	P488-01	D6-103	811-01	TM-11	Audio Coupling
C62	.01	600	46AZ103J	P688-01	D6-103	811-01	TM-11	AF Amp. Screen Bypass
C63	.01	600	46AZ103J	P688-01	D6-103	811-01	TM-11	Audio Coupling
C64	.01	600	46AZ103J	P688-01	D6-103	811-01	TM-11	Output Plate Bypass §
C65	.002	600	46AZ202J	P688-002	D6-202	GP2M-002	TM-23	Integrator Net.
C66	.005	600	46AZ502J	P688-005	D6-502	811-005	TM-25	Integrator Net.
C67	4700	500	CM35A472K	1467-005	D6-472	GP2M-0047	1FM-25	Vert. Osc. Grid Cap.
C68	.1	600	46AY104J	P688-1			TM-1	Vert. Discharge
C69	.25	800	46AY254J	684-25			TC-2	Vert. Sweep Coupling
C70	1500	500	CM30A152K	1467-0015	D6-152	GP2L-0015	1FM-215	Hor. Sync. Coupling
C71	1500	500	CM30A152K	1467-0015	D6-152	GP2L-0015	1FM-215	Hor. Sync. Coupling
C72	.02	600	46AY203J	P688-02			TM-12	Voltage Divider
C73	.005	600	46AZ502J	P688-005	D6-502	811-005	TM-25	AFC Feedback
C74	.005	800	46AZ502J	P688-005	D6-502	811-005	TM-25	Hor. Sync. Coupling
C75	.005	600	46AZ502J	P688-005	D6-502	811-005	TM-25	Hor. Osc. Grid Cap.
C76	330	500	CM20A331K	1468-0003	D6-331	GP2K-330	1FM-335	Hor. Osc. Feedback
C77	390		47B20391K5	GP390K	D6-391	GP2K-390	1FM-34	Hor. Discharge
C78	390	500	CM20A391M	1468-004	D6-391	GP2K-390	1FM-34	Hor. Sync. Coupling
C79	.01	600	46AZ103J	P688-01	D6-103	811-01	TM-11	Hor. Amp. Screen Bypass
C80	.035	600	46AY353J	P688-03				Damper Filter
C81	.1	800	46AY104J	P688-1			TM-1	Damper Filter
C82	.01	600	46BR1031J6	P688-01	D6-103	811-01	TM-11	Line Filter
C83	.01	600	46BR1031J6	P688-01	D6-103	811-01	TM-11	Line Filter
C84	.1	200	46AU104J	P288-1			TM-1	Picture Tube Cath. Dec.
C85	2700	500	CM30A272J	GP2700M	D6-272	GP2M-0027		HV Osc. Grid Cap.
C86	.1	600	46AY104J	P688-1			TM-1	RF Bypass
C87	.1	400	46AY104J	P488-1			TM-1	HV Osc. Cath. Decoupling
C88	.01	600	46AZ103J	P688-01	D6-103	811-01	TM-11	HV Osc. Coupling
C89	.015	400		P488-015			TM-12	Bias Filter
C90	.03	400	46AW303J	P488-03			TM-13	Bias Filter
C91	6200	500	CM35A623J					Fixed Trimmer
C92	470	500		1468-0005	D6-471	GP2K-470	1FM-35	AF Plate Bypass

* Used only in models using 6AK5 mixer tube.
† When either item C58 or C59 are replaced, replace both with capacitors of equal value.
§ Not used in all models.
† Use mounting strap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	INSTALLATION NOTES
R1A	50KΩ	½	25B788	B11-123 *			Horiz. hold control, panel
B	1 Meg.	½		B11-137 *			Vert. hold control, rear
C	Shaft End			E-202 *			Attach per instructions in "Concentrikit".
R2	2500Ω	2	25B789				Contrast control and switch
R3A	50KΩ	½	25B787	B11-123 *			Brightness control, panel
B	1 Meg.	½		B13-137 *			Volume control, rear
C	Shaft End			E-202 *			Attach per instructions in "Concentrikit".
R4A	5000Ω	½	25B769	Q11-114	AM-19-S		Vert. linearity control
B	Shaft		Not Req.	RQ	KSS-3 #		Attach to R4A per instructions
R5A	2.5 Meg.	½	25B768	Q11-239	AM-84-S		Height control
B	Shaft		Not Req.	RQ	KSS-3 #		Attach to R5A per instructions
R6	20Ω	2	25B707	W-20 #	43-20 #	V-110 #	Horiz. centering control
R7	20Ω	2	25B706	W-20x10 #	43-20 CT #		Vert. centering control, tapped @ 10Ω
R8	500Ω	4	25B709		58-500 #	V-127 #	Focus control

* Additional parts to be used with "Concentrikit".
# File slot in shaft to duplicate original.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES: ALL RESISTORS ±10% UNLESS OTHERWISE STATED
R9	150Ω	½	RC20AE151K		RF Grid
R10	150Ω	½	RC20AE151K		RF Cathode
R11	10KΩ	½	RC20AE103K		RF Plate Coil Shunt
R12	15KΩ	1	RC30AE153K	BTA-15K	Voltage Dropping
R13	1 Meg.	½	RC20AE105M		Mixer Grid
R14	10KΩ	1	RC30AE103K	BTA-10K	Voltage Dropping
R15	2200Ω	½	RC20AE222K	BTS-2200	Oscillator Plate
R16	22KΩ	½	RC20AE223K	BTS-22K	Oscillator Grid
R17	100KΩ	½	RC20AE104K	BTS-100K	AGC Network
R18	100KΩ	½	RC20AE104K	BTS-100K	AGC Network
R19	100KΩ	½	RC20AE104K	BTS-100K	AGC Network
R20	100KΩ	½	RC20AE104K	BTS-100K	AGC Network
R21	470KΩ	½	RC20AE474K	BTS-470K	AGC Filter
R22	22KΩ	½	RC20AE223K		1st IF Grid
R23	2200Ω	½	RC20AE222K	BTS-2200	1st IF Decoupling
R24	5600Ω	½	RC20AE562K	BTS-5600	2nd IF Grid
R25	2200Ω	½	RC20AE222K	BTS-2200	2nd IF Decoupling
R26	68Ω	½	RC20AE680K		2nd IF Cathode
R27	8200Ω	½	RC20AE822K		3rd IF Grid
R28	68Ω	½	RC20AE680K		3rd IF Cathode
R29	2200Ω	½	RC20AE222K	BTS-2200	3rd IF Decoupling
R30	5600Ω	½	RC20AE562K	BTS-5600	4th IF Grid
R31	68Ω	½	RC20AE680K		4th IF Cathode
R32	8200Ω	½	RC20AE822K	BTS-8200	4th IF Plate
R33	2200Ω	½	RC20AE222K	BTS-2200	4th IF Decoupling
R34	220KΩ	½	RC20AE224K	BTS-220K	AGC Network
R35	5600Ω	½	RC20AE562K	BTS-5600	Video Detector Load
R36	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Video Amp. Grid
R37	3300Ω	½	RC30AE332K	BTA-3300	Video Amp. Plate
R38	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Video Output Grid
R39	680Ω	2	RC20AE681K	BTS-680	Video Output Cathode
R40	4700Ω	2	RC40AE472K	BT-2-4700	Video Output Plate
R41	47KΩ	½	RC20AE473K	BTS-47K	Picture Tube Grid
R42	27KΩ	½	RC20AE273K	BTS-27K	Voltage Divider
R43	270KΩ	½	RC30AE274K	BTS-270K	DC Restorer Cathode
R44	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Sync Amp. Plate
R45	3900Ω	½	RC20AE392K	BTS-3900	Sync Phase Inverter Plate
R46	3900Ω	½	RC20AE392K	BTS-3900	Sync Phase Inverter Plate
R47	15KΩ	½	RC20AE153K	BTS-15K	Integrator
R48	8200Ω	½	RC20AE822K	BTS-8200	Integrator
R49	8200Ω	½	RC20AE822K	BTS-8200	Integrator

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R50	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Sync Phase Inverter Grid
R51	3900Ω	½	RC20AE392K	BTS-3900	Sync Phase Inverter Cathode
R52	150KΩ	½	RC20AE154K		Sound IF Grid
R53	12KΩ	½	RC20AE123K	BTS-12K	Voltage Divider
R54	30KΩ	½	RC20AE333K	BTS-33K	Voltage Divider
R55	91000Ω 5%	½	RC20AE103J ¶	BTS-10K-5% ¶	Ratio Detector Diode Load
R56	91000Ω 5%	½	RC20AE103J ¶	BTS-10K-5% ¶	Ratio Detector Diode Load
R57	33KΩ	½	RC20AE333K	BTS-33K	De-emphasis
R58	330Ω	½	RC20AE331K	BTA-330	AF Cathode
R59	68KΩ	1	RC30AE683K	BTS-68K	Voltage Divider
R60	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	AF Screen
R61	470KΩ	½	RC20AE474K	BTS-470K	AF Plate
R62	1000Ω	1	RC30AE102K	BTA-1000	AF Decoupling
R63	470KΩ	½	RC20AE474K	BTS-470K	Output Grid
R64	680Ω	1	RC30AE681K	BTA-680	Output Cathode
R65	47KΩ	½	RC20AE473K	BTS-47K	Voltage Divider
R66	5600Ω	½	RC20AE562K	BTS-5600	Voltage Divider
R67	1.2 Meg.	½	RC20AE125K	BTS-1.2 Meg.	Vert. Osc. Grid
R68	1.5 Meg.	½	RC20AE155K	BTS-1.5 Meg.	Vert. Osc. Grid
R69	100KΩ	½	RC20AE104K	BTS-100K	Voltage Divider
R70	6.8 Meg.	½	RC20AE685K	BTS-6.8 Meg.	Voltage Divider
R71	560Ω	½	RC20AE561K	BTS-560	Vert. Amp. Cathode
R72	2.2 Meg.	½	RC20AE225K	BTS-2.2 Meg.	Vert. Amp. Grid
R73	3300Ω	1	RC30AE332K	BTA-3300	Vert. Peaking
R74	1.5 Meg.	½	RC20AE155K	BTS-1.5 Meg.	Vert. Osc. Plate
R75	100KΩ 5%	½	RC20AE104K	BTS-100K-5%	Horiz. Sync Disc. Load
R76	100KΩ 5%	½	RC20AE104K	BTS-100K-5%	Horiz. Sync Disc. Load
R77	4.7 Meg.	½	RC20AE475K	BTS-4.7 Meg.	Horiz. Sync Disc. Load
R78	5600Ω	½	RC20AE562K	BTS-5600	Feedback Network
R79	470KΩ 5%	½	RC20AE474K	BTS-470K-5%	AFC Filter
R80	5600Ω	½	RC20AE562K	BTS-5600	Horiz. Osc. Plate
R81	1000Ω	½	RC20AE102K	BTS-1000	Horiz. Osc. Cathode
R82	68KΩ	½	RC20AE683K	BTS-68K	Horiz. Osc. Grid
R83	270KΩ	½	RC20AE274K	BTS-270K	Horiz. Osc. Plate
R84	4700Ω	½	RC20AE472K	BTS-4700	Horiz. Peaking
R85	2200Ω	½	RC20AE222K	BTS-2200	Filter
R86	1 Meg.	½	RC20AE105M	BTS-1 Meg.	Horiz. Output Grid
R87	47Ω	½	RC20AE470K		Parasitic Suppressor
R88	82Ω	1	RC30AE820K		Horiz. Output Cathode
R89	4700Ω	2	RC40AE472K	BT-2-4700	Horiz. Output Screen
R90	1800Ω	2	RC40AE182K	BT-2-1800	Filter
R91	8200Ω	1	RC30AE822K	BTA-8200	Feedback Network
R92	1800Ω	2	RC40AE182K	BT-2-1800	Focus Coil Shunt
R93	200Ω	10	24BG201E	AB-200	Series Focus Coil
R94	2000Ω	20	24BH202E	DG-2000	Filter
R95	2500Ω	5	24BF252	AB-2500	Filter
R96	390KΩ 5%	1	RC30AE394J	BTA-390K-5%	HV Osc. Grid
R97	220KΩ	1	RC30AE224K	BTA-220K	HV Osc. Cathode
R98	330Ω	1	RC20AE331K	BTA-330	Parasitic Suppressor
R99	330KΩ	½	RC20AE334K	BTS-330K	HV Amp. Grid
R100	220KΩ 5%	½	RC20AE224K	BTS-220K-5%	Bias Network
R101	47KΩ 5%	½	RC20AE473K	BTS-47K-5%	Bias Filter
R102	390Ω	2	RC40AE391K	BW-2-390	HV Amp. Cathode
R103	1.5 Meg.	1	23A075		HV Filter
R104	18KΩ	1	RC30AE183K	BTA-18K	Voltage Divider

¶ When either item R55 or R56 are replaced, replace both with resistors of equal value.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC @ 2.01A	740VCT @ .24ADC	5VAC @ 3A	5VAC @ 2A SEC. 4 6.3VAC @ 8.1A	52-170	P-8153 ♦		TP-410

♦ Drill new mounting holes.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	NOTES
T2	40Ω		50B411				Horiz. Osc. Coil
T3	200Ω	1200Ω	55115	A-8111	A-3000	TBO-1	Vert. Block Osc. Trans.
T4	91Ω	14Ω Tap @ 2Ω	55117				Horiz. Output Trans.
T5	590Ω	7Ω	55114	A-8115	A-3035	TSO-1	Vert. Output Trans.
T6A	15Ω						Horiz. Deflection Yoke
B	60Ω						Vert. Deflection Yoke
T7	29Ω						Focus Coil
T8	145Ω	200Ω	52176				HV Osc. Trans.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	INSTALLATION NOTES
T9	8.8KΩ	3.2Ω	280Ω	.4Ω	Part Of 85C086	A-8114	A-2900	RO-16	

SPEAKER

ITEM No.	RATINGS: FIELD RES.	RATINGS: V. C. IMP.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	65Ω	3.2Ω	85C086		8E65S	
	CONE DIA.	V. C. DIA.				
SP2	7 3/4"	3/4"				

AIRLINE MODELS 84HA3010A, B, C

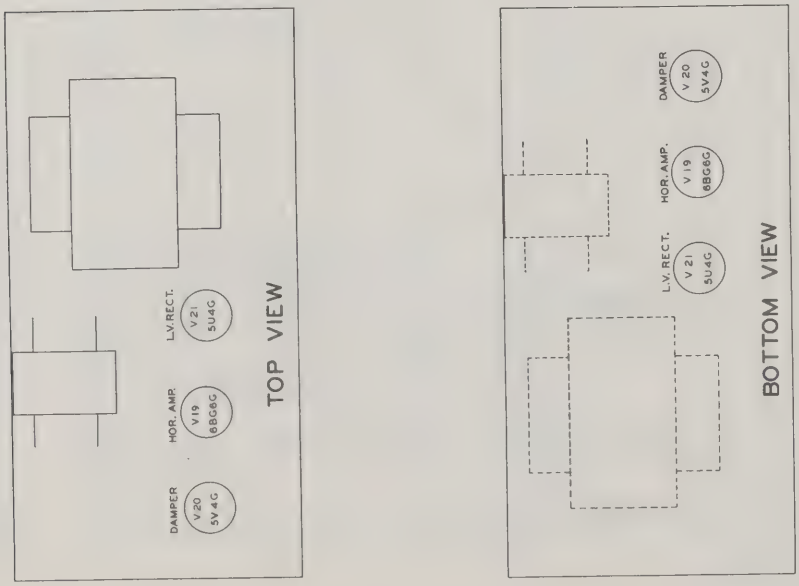
PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

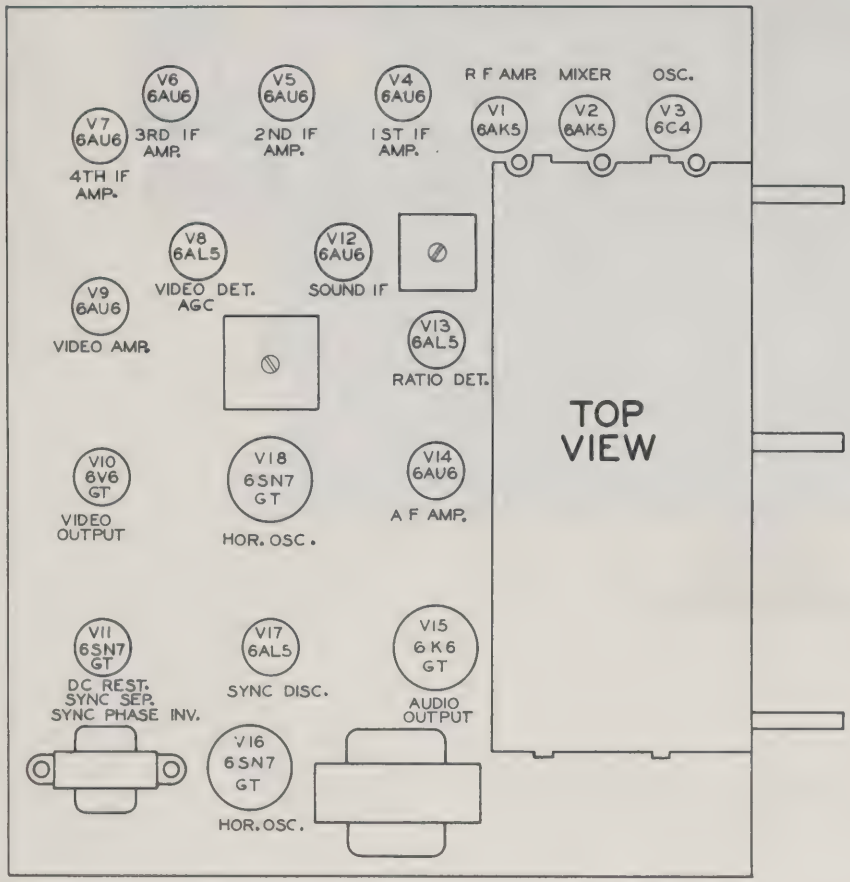
ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	
L1	Ant. Input	0Ω		51A1039		
L2	RF Plate	0Ω		51A1048		Wound on 3300Ω - 1 Watt resistor.
L3	RF Plate	0Ω		51A1051		Wound on 2200Ω - 1 Watt resistor.
L4	RF Plate	0Ω		51A1050		Wound on 3300Ω - 1 Watt resistor.
L5	RF Plate	0Ω		51A1049		Wound on 1 Meg. - ½ Watt resistor.
L6	RF Choke	2Ω		53B008		
L7	Mixer Grid	0Ω		51A1048		Wound on 3300Ω - 1 Watt resistor.
L8	Mixer Grid	0Ω		51A1047		Wound om2200Ω - 1 Watt resistor.
L9	Mixer Grid	0Ω		51A1046		Wound on 3300Ω - 1 Watt resistor.
L10	Mixer Grid	0Ω		51A1041		Wound on 1 Meg. - ½ Watt resistor.
L11	Osc. Coil	0Ω		51A1044		Wound on 1 Meg. - 1 Watt resistor.
L12	Osc. Coil	0Ω		51A1043		Wound on 1 Meg. - 1 Watt resistor.
L13	Osc. Coil	0Ω		51A1042		Wound on 1 Meg. - 1 Watt resistor.
L14	Osc. Coil	0Ω		51A1041		Wound on 1 Meg. - ½ Watt resistor.
L15	RF Choke	2Ω		53B008		
L16	Fil. Choke	.1Ω	.1Ω	53A133		
L17	Fil. Choke	.2Ω		53A009		
L18	1st Video IF	.1Ω		50A372-1		
L19	2nd VideoIF	.1Ω		50A372-1		
L20	3rd Video IF	.1Ω		50A372-1		
L21	4th Video IF	.1Ω		50A372-1		
L22	Video Det.	.1Ω		50A372-1		
L23	Peaking	9Ω		51A1079		Wound on 39KΩ resistor.
L24	Peaking	12Ω		51A1080		Wound on 1 Meg. resistor.
L25	Peaking	7Ω		51A1087		
L26	Peaking	6Ω		51A1082		Wound on 1 Meg. resistor.
L27	Peaking	7Ω		51A1086		
L28	Peaking	6Ω		51A1082		Wound on 1 Meg. resistor.
L29	Sound Trap	4.5Ω		51B1037		
L30	Ratio Det.	4.5Ω	.1Ω	50B406		
L31	Width Control	.5Ω		51B1072		
L32	Hor. Lin. Cont	34Ω		51B1071		

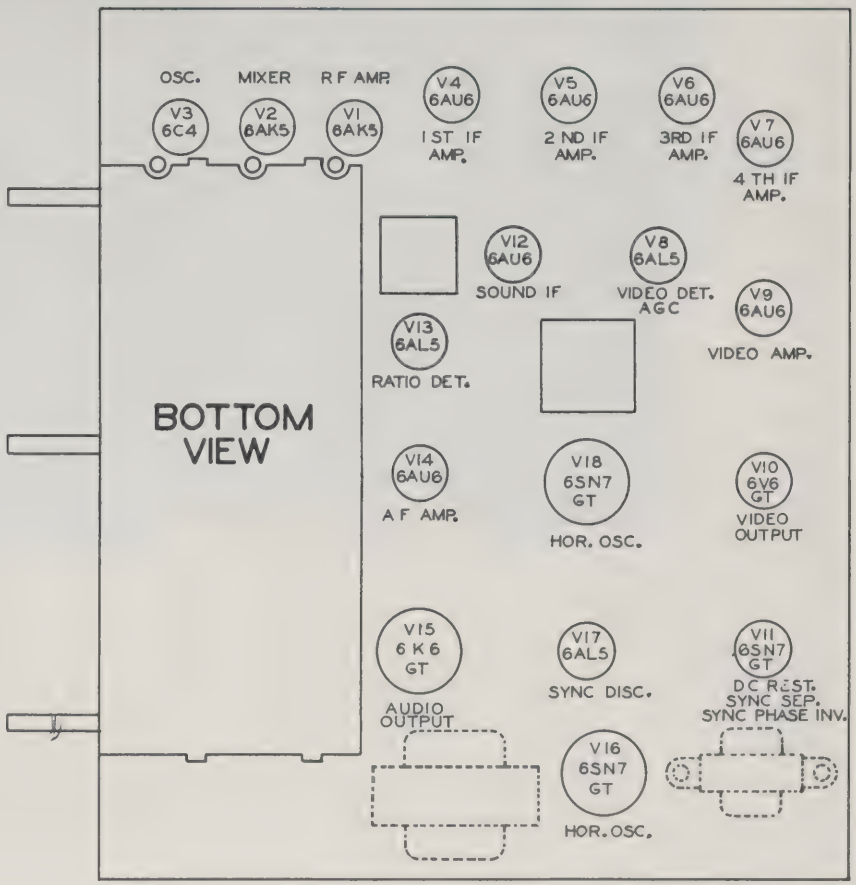
MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M1	Channel Selector Assembly	41X12301	
M2	Fuse	39A334	Type 3AG - 1/4 Ampere
M3	Socket	6A312	6 Pin (Power)
M4	Socket	6A313	9 Pin (Power)
M5	Socket	10A303	5 Pin (Speaker)
M6	Socket	6A270-4	4 Pin (Power)
M7	Plug	10A236-1	4 Prong (Power)
M8	Plug	10A239-1	8 Prong - Focus and Deflection Coils.
M9	Socket	10A290-1	8 Pin - Focus and Deflection Coils.
M10	HV Trans. Assembly	52A177	Sealed Unit - Contains 3 HV Rectifier Tubes and Capacitors.
	Socket	87B072	Projection Tube
	Mirror	22C217	
	Knob	15B147	Vert. and Volume Controls (Front Sections)
	Knob	15B146	Horiz. and Brightness Controls (Rear Sections)
	Knob	15B148	Contrast Control
	Knob	17A041-2	Pushbutton and Fine Tuning
	Projection Unit	1X749	Mounting and Alignment Assembly Complete
	Projection Unit	1X750	Optical Assembly Complete with Mirrors and Lens
	Projection Unit	87A1677	HV Cable Assembly (Includes resistor R67)

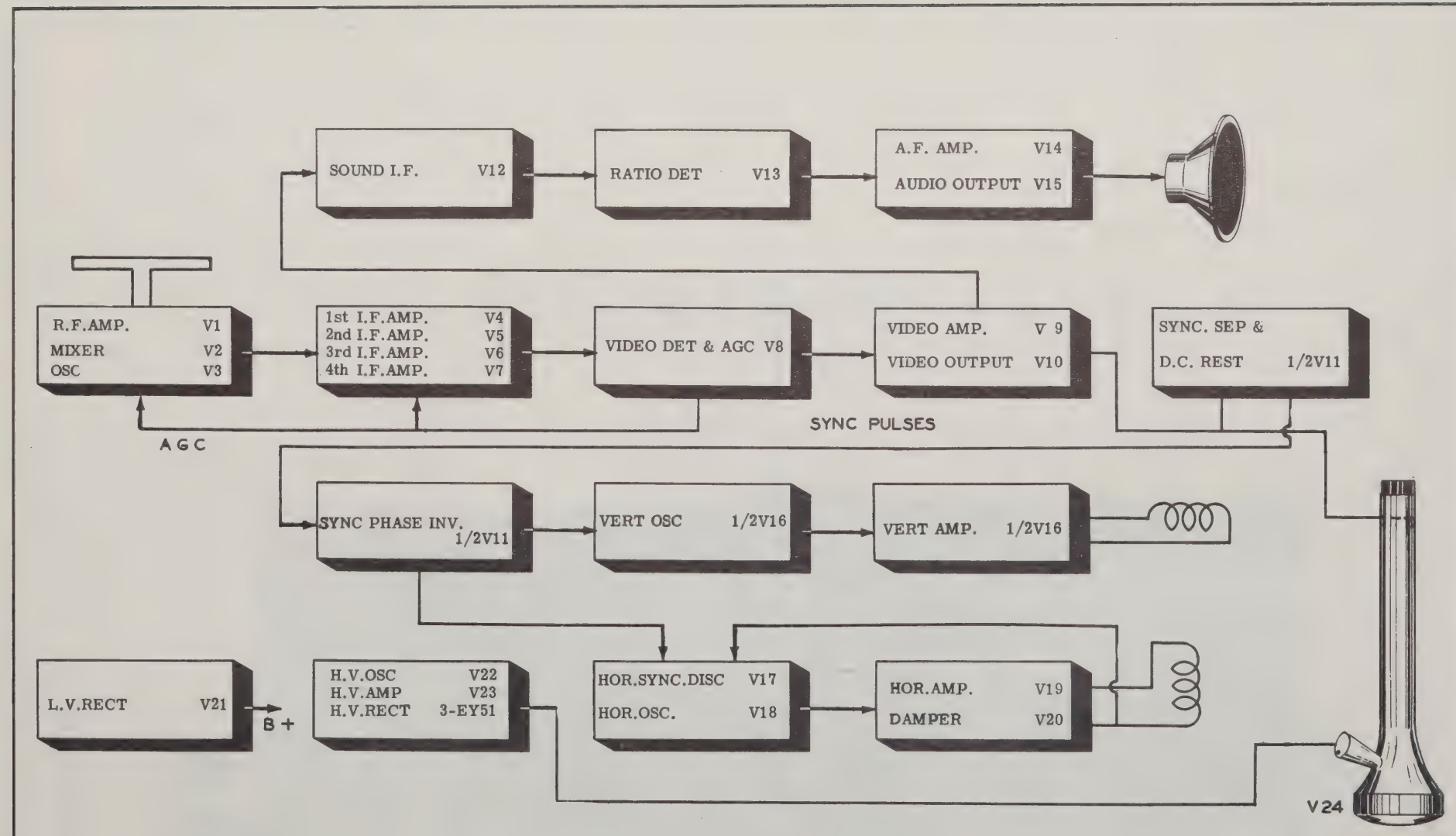


TUBE PLACEMENT CHART





TUBE PLACEMENT CHART



BLOCK DIAGRAM

PHOTOFACT* Folder

CROSLEY MODELS 9-409M3, 9-419M1, 9-419M1-LD, 9-419M2, 9-419M3, 9-419M3-LD

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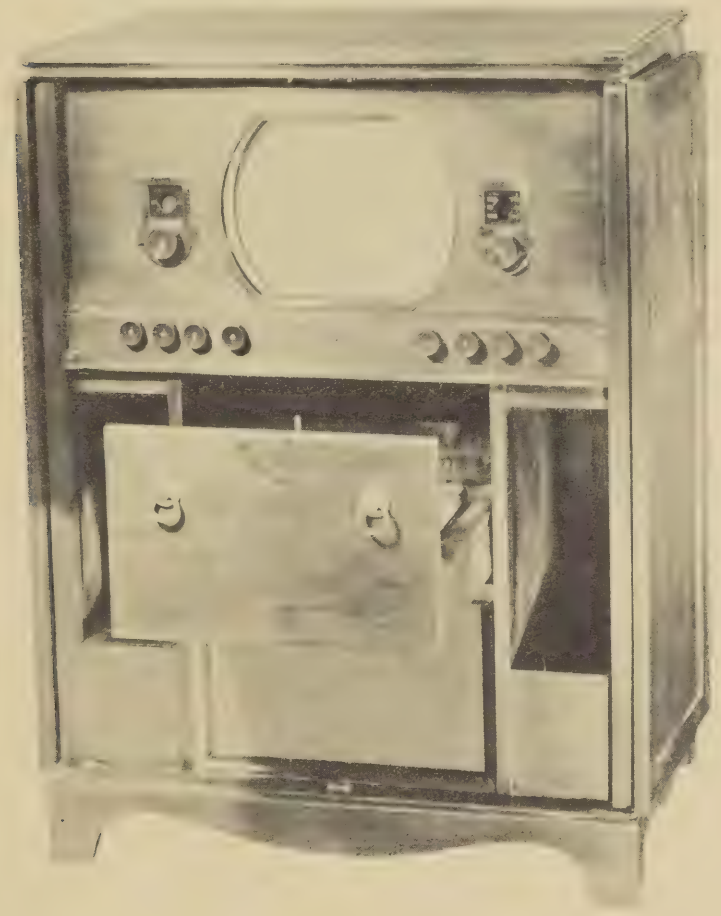

MODEL 9-409M3

CROSLEY MODELS 9-409M3, 9-419M1, 9-419M1-LD, 9-419M2, 9-419M3, 9-419M3-LD

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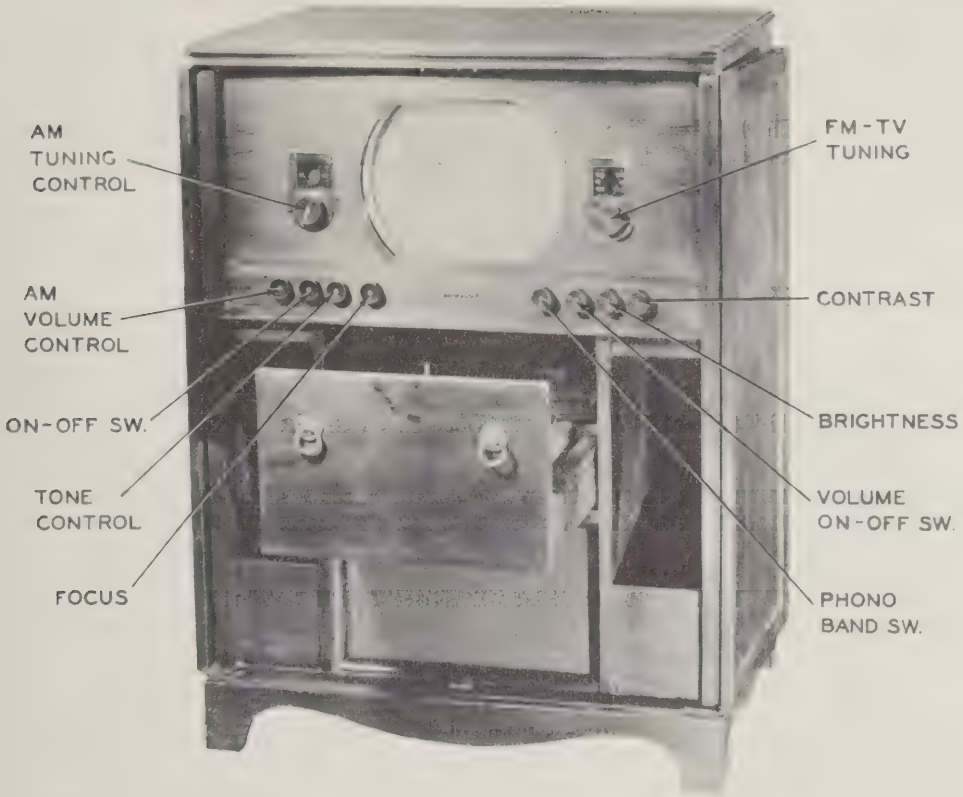
CROSLEY MODELS 9-409M3, 9-419M1 9-419M1-LD, 9-419M2, 9-419M3, 9-419M3-LD



CROSLEY MODEL 9-409M3

TRADE NAME	Crosley Models 9-409M3, 9-419M1, 9-419M1-LD, 9-419M2, 9-419M3, 9-419M3-LD
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AM-FM-TV-Phono Receiver
TUBES	Thirty Three Thirty Four (Models 9-419M1-LD, 9-419M3-LD)
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 2.25 Amp. @ 117 Volts AC (TV), .62 Amp. @ 117 Volts AC (Radio)
TUNING RANGE	AM 540 - 1600KC TV-FM 44 - 216MC (Continuous Tuning)

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FOR SERVICE INFORMATION ON RECORD CHANGER UNIT-SEE MISCELLANEOUS MODEL 700F-33/45 PHOTOFACT SET #75-FOLDER #11.

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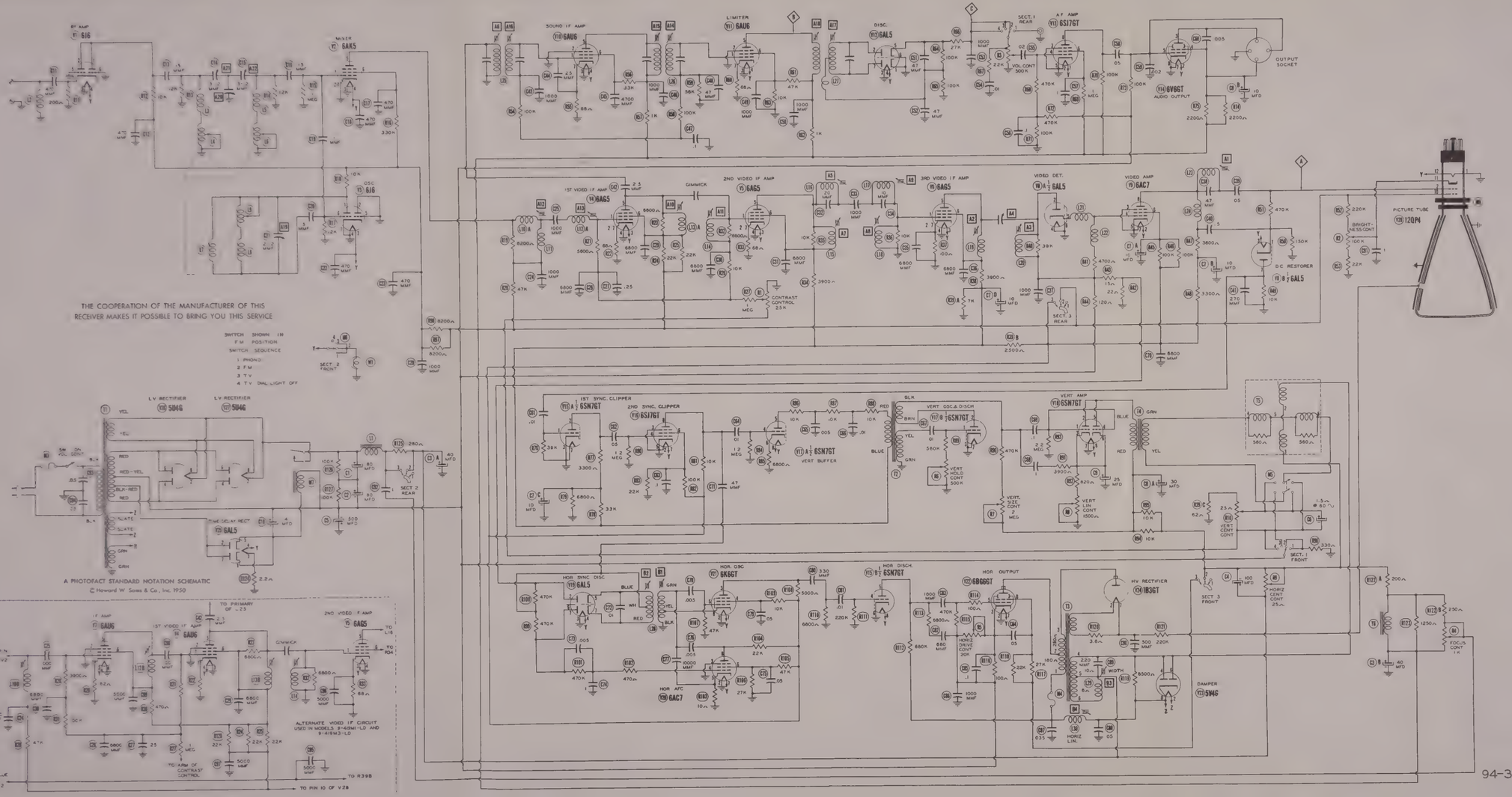
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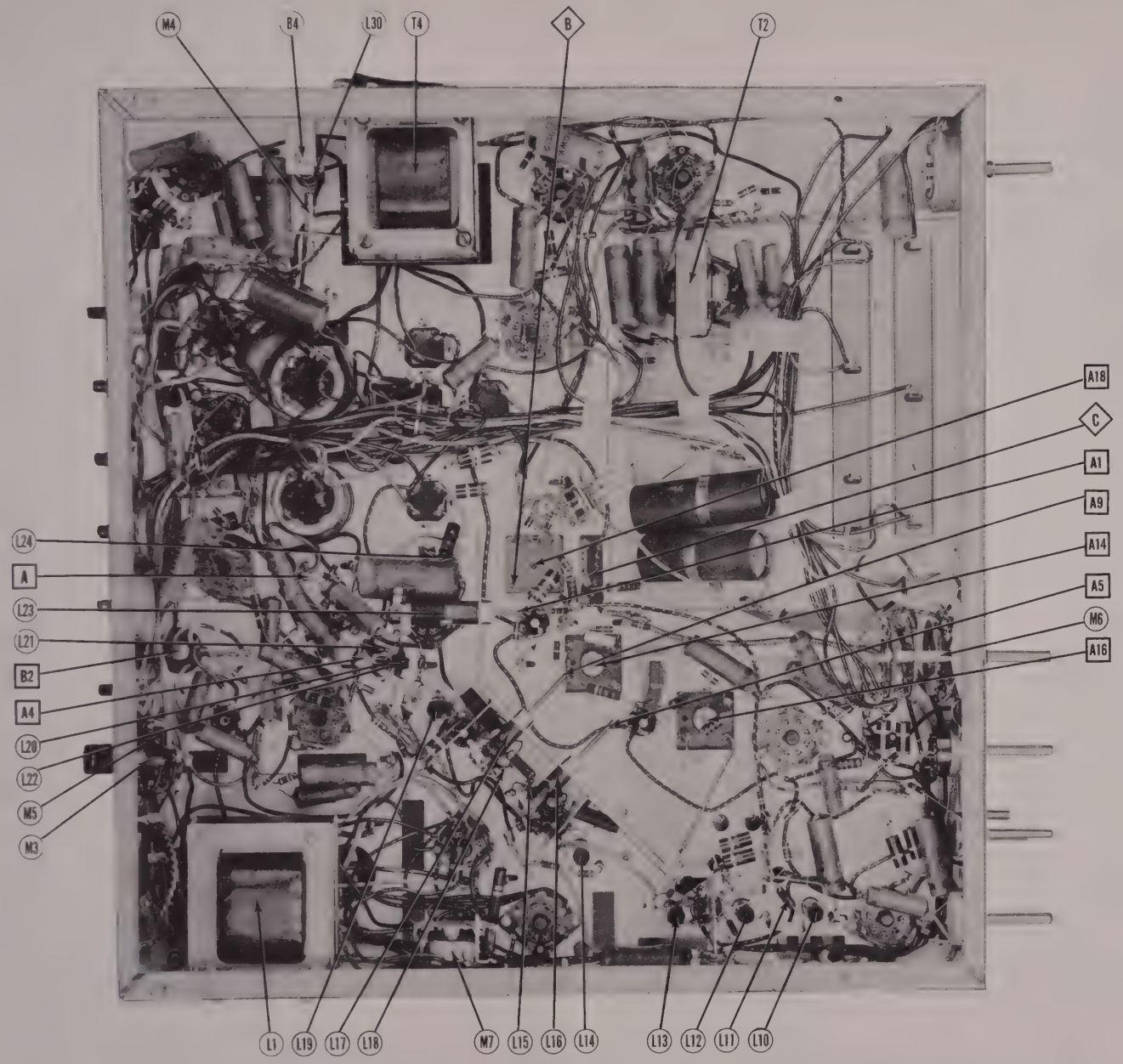
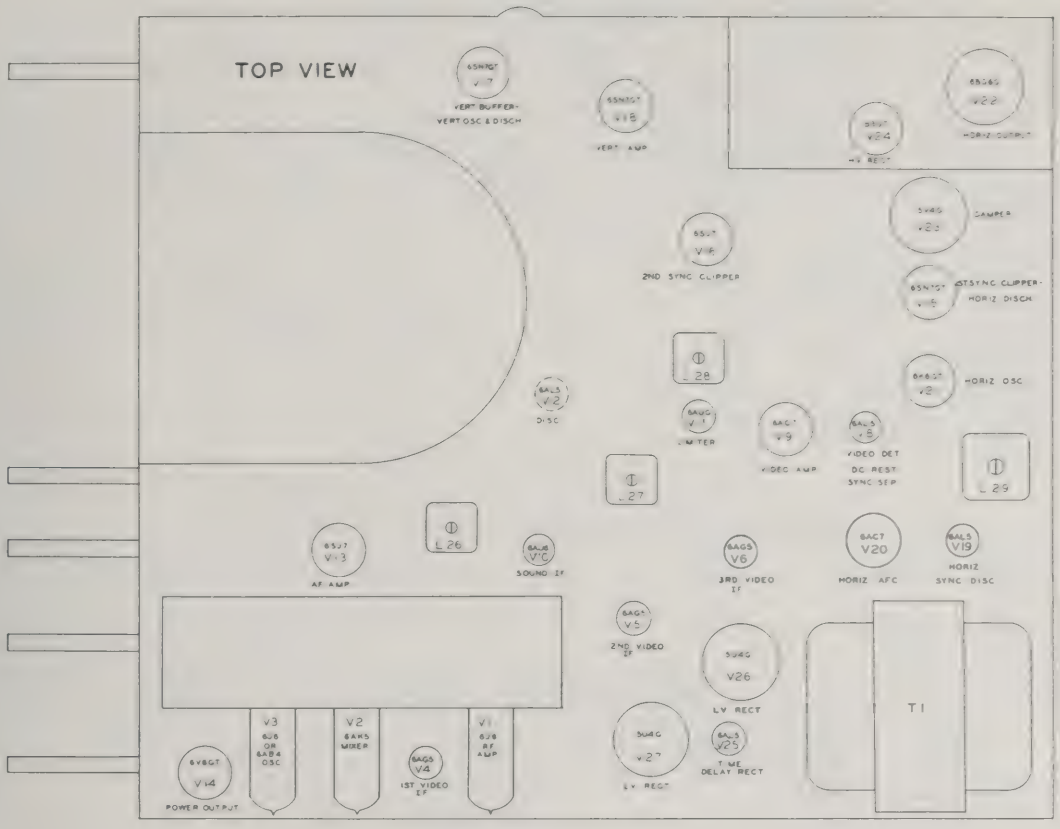
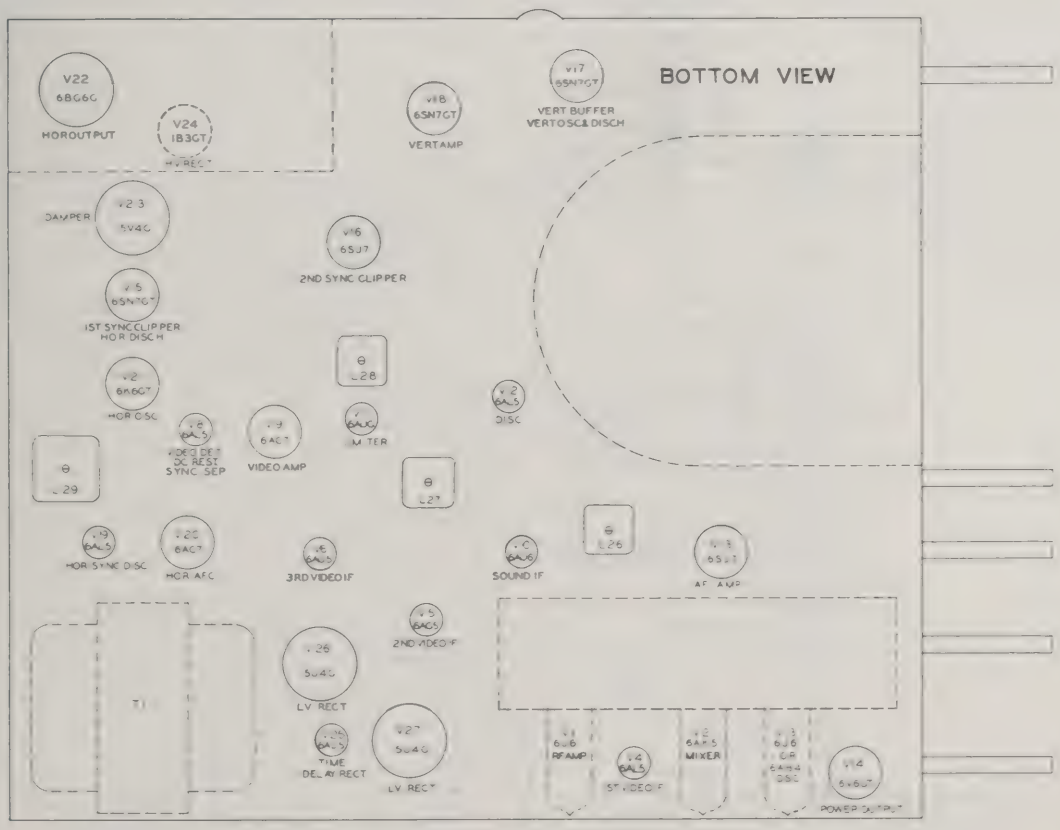
94-3

CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION


TOP VIEW
V7 6SN7GT VERT BUFFER-VERT OSC & DISCH
V18 6SN7GT VERT AMP
V22 6BG6G HORIZ OUTPUT
V24 1B3GT H.V. RECT
V23 5V4G DAMPER
V16 6SU7 2ND SYNC CLIPPER
V5 6SN7GT 1ST SYNC CLIPPER-HORIZ DISCH
V2 6AB8 HORIZ OSC
V1 6AU6 1ST VIDEO IF
V9 6AC7 VIDEO AMP
V8 6AL5 VIDEO DET DC REST SYNC SEP
V3 6U8 OR 6AB4 OSC
V2 6AK5 MIXER
V1 6U8 R.F. AMP
V4 6AG5 1ST VIDEO I.F.
V14 6V6GT POWER OUTPUT
V27 5U4G L.V. RECT
V25 6AL5 T. M. DELAY RECT
V26 5U4G L.V. RECT
T1
V3 6SU7 A.F. AMP
V2 6AL5 DISC
V1C 6AU6 SOUND I.F.
V6 6AG5 3RD VIDEO I.F.
V20 6AC7 HORIZ A.F.C.
V19 6AL5 HORIZ SYNC DISC
V5 6AG5 2ND VIDEO I.F.
L 26
L 27
L 28
L 29


BOTTOM VIEW
V22 6BG6G HOROUTPUT
V24 1B3GT H.V. RECT
V18 6SN7GT VERT AMP
V17 6SN7GT VERT BUFFER VERT OSC & DISCH
V23 5V4G DAMPER
V16 6SU7 2ND SYNC CLIPPER
V5 6SN7GT 1ST SYNC CLIPPER HOR DISCH
V2 6AB8GT HOR OSC
V8 6AL5 VIDEO DET DC REST SYNC SEP
V9 6AC7 VIDEO AMP
V1 6AU6 M. TER
V2 6AL5 DISC
V19 6AL5 HOR SYNC DISC
V20 6AC7 HOR A.F.C.
V6 6AG5 3RD VIDEO I.F.
V1C 6AU6 SOUND I.F.
V3 6SU7 A.F. AMP
V5 6AG5 2ND VIDEO I.F.
V26 5U4G L.V. RECT
V27 5U4G L.V. RECT
V25 6AL5 T. M. DELAY RECT
V1 6U8 R.F. AMP
V4 6AG5 1ST VIDEO I.F.
V3 6U8 OR 6AB4 OSC
V14 6V6GT POWER OUTPUT
T1
L 26
L 27
L 28
L 29

TUBE PLACEMENT CHART

TV ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V21) from its socket.
Turn the function selector switch to "TELEVISION".

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Remove the local oscillator tube (V3) to prevent erroneous indications.
During alignment keep the contrast control set just below the point of overloading.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 4 (Grid) of 6AC7 (V9). Low side to chassis.	Not used	4.5MC (400 ∿ AM Mod.)	Any channel not used locally.	Vert. Amp. to Point (A) Low side to chassis.	A1	Adjust for MINIMUM 400 ∿ response on scope.
2.	.001MFD	High side to pin 1 (Grid) of 6AG5 (V6). Low side to chassis.	25MC (10MC SWP)	26.4MC 22.9MC	Any	"	A2, A3, A4	Adjust for response curve similar to Fig 2. A4 effects the band pass and is adjusted by spreading or squeezing the wires at the center of the "gimmick".
3.	.001MFD	High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis.	Not used	21.9MC (400 ∿ AM Mod.)	"	"	A5, A6	Adjust for MINIMUM 400 ∿ response on scope.
4.	.001MFD	High side to pin 1 (Grid) of 6AG5 (V5). Low side to chassis.	25MC (10MC SWP)	26.4MC 22.9MC	"	"	A7, A8	Adjust for response curve similar to Fig 3.
5.	.001MFD	"	"	27.9MC	"	"	A9	Use maximum marker output. Adjust for minimum marker indication at the 27.9MC point on curve.
6.	.001MFD	High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis.	"	26.4MC 22.9MC	"	"	A10, A11	Adjust for response curve similar to Fig 4. BE SURE CONTRAST CONTROL IS SET BELOW THE POINT OF OVERLOAD.
7.	.001MFD	High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	"	26.4MC 22.9MC	"	"	A12, A13	Adjust for response curve similar to Fig 5. If necessary retouch A2 thru A13 for proper response.

SOUND IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	.001MFD	High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis.	21.9MC (1MC SWP)	21.9MC	Any	Vert. Amp. thru detector probe (Fig 1) to point (B) Low side to chassis.	A14, A15,	Adjust for maximum amplitude and symmetry as per Fig 6.
9.	.001MFD	"	"	"	"	Vert. Amp. to Point (C) Low side to chassis.	A17, A18	Adjust A17 so 21.9MC occurs at the center of the diagonal line as per Fig 7. Adjust A18 for maximum amplitude and straightness of diagonal line.

OSCILLATOR ALIGNMENT

Replace the local oscillator tube (V2).
Unsolder the blue lead only from the tuner. Remove the tuner mounting screws. Remove the bottom shield and replace it with the dummy shield shown in figure 8.
Reconnect the blue lead temporarily.
Check the dial setting on the shaft by turning the shaft clockwise to the stop. The reference marks should coincide on the perpendicular centerline of the shaft.
The sound IF portion of the receiver must be properly aligned before attempting oscillator alignment.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	Direct	High side to ungrounded antenna terminal. Low side to chassis.	71.75MC (Unmod.)	4	DC Probe to Point (C) Common to chassis.	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
11.	Direct	"	215.75MC	13	"	L104	Expand or compress coil turns for zero reading as obtained in the step above.
12.	Direct	"	209.75MC	12	"		Check all channels to see that zero reading as obtained in step 9 occurs at the proper dial setting as the sound carrier frequency for each channel is fed into the receiver.
			203.75MC	11			
			197.75MC	10			
			191.75MC	9			
			185.75MC	8			
			179.75MC	7			
			87.75MC	6			
			81.75MC	5			
			71.75MC	4			
			65.75MC	3			
			59.75MC	2			

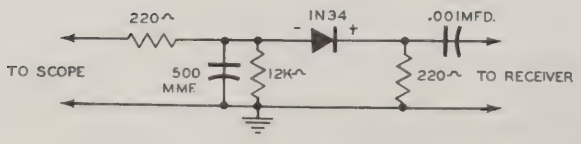


FIG.1

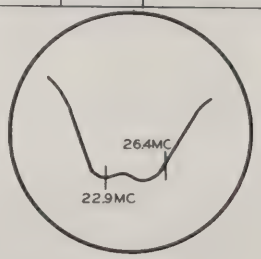


FIG.2

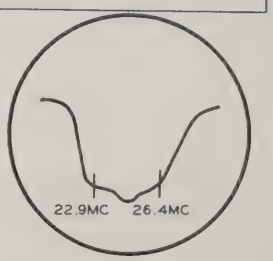


FIG.3

TV ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

Leave the dummy shield on the tuner as used during oscillator alignment. Solder a 5 inch lead to the screen grid of the mixer tube (V2). Run this lead through the plate lead hole to the under side of the chassis. Set the dial to channel 4 by feeding a 71.75MC signal into the antenna and setting the dial to read zero discriminator output, follow step 10 to obtain this setting. Do not change this dial setting during low band RF alignment. After this setting has been obtained, unsolder the blue lead from the tuner and connect it, together with the 5 inch screen lead, to the oscilloscope vertical input.

After step 13 has been completed, reconnect the blue lead and set the dial to channel 13 by feeding a 215.75MC signal into the receiver and tuning for zero discriminator output. Follow step 11 for this setting.

Disconnect the blue lead and connect it together with the 5 inch screen lead to the oscilloscope vertical input.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Direct	High side to ungrounded antenna terminal. Low side to chassis.	69MC (10MC SWP)	67.25C 71.75MC	4	See instructions above	A20, A21,	Adjust for response curve similar to Fig 9. The adjustment of A21 and A22 is correct when the rocking of A20 causes no appreciable change in response, amplitude. The dip between the two markers should not exceed 30%.
14.	Direct	"	213MC (10MC SWP)	211.25MC 215.75MC	13	"	L3, L6, C14, C16	Adjustment of the high band is accomplished by positioning of L3, L6, C14 and C16 for curve similar to Fig 10. The band width should not exceed 6MC or be less than 4.5MC on channel 13. If adjustment of channel 13 is required, repeat steps 13 and 14 until no further improvement can be made.

RADIO ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn the AM radio switch "ON".

To set the dial scale, turn the tuning gang fully closed and set the reference mark at the low frequency end of the dial scale directly over the center of the tuning shaft.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
15	.25MFD	High side to stator on center section of tuning gang. Low side to chassis.	455KC (400 ∿ Mod.)	AM	Tuning gang fully open	Across voice coil	A23, A24, A25, A26	Adjust for maximum output.
16		Loop	1620KC	"	"	"	A27	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
17		Loop	1400KC	"	Tune for max. output.	"	A28, A29	"

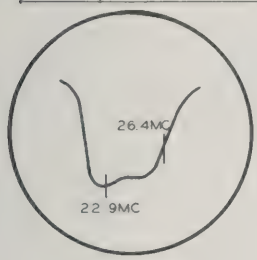


FIG. 4

FIG. 5

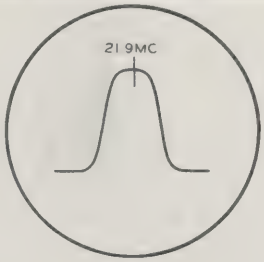


FIG. 6

FIG. 7

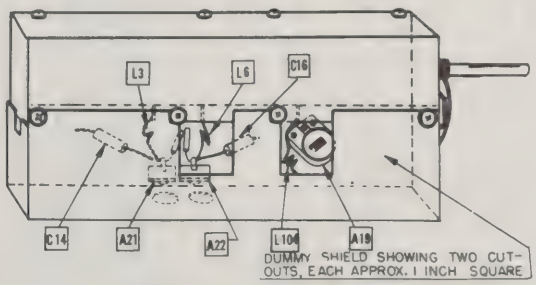


FIG. 8

FIG. 9

FIG. 10

TV VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6J6	133VDC	133VDC	0V.	6.3VAC	0V.	.0V.	1.8VDC		
V 2	6AK5	0V.	0V.	0V.	6.3VAC	180VDC	50VDC	0V.		
V 3	6AB4	165VDC	0V.	6.3VAC	0V.	0V.	§-6VDC	0V.		
V 4	6AG5	0V.	.7VDC	6.3VAC	0V.	165VDC	165VDC	.7VDC		
V 5	6AG5	0V.	.7VDC	6.3VAC	0V.	117VDC	117VDC	.7VDC		
V 6	6AG5	0V.	.5VDC	6.3VAC	0V.	125VDC	125VDC	.5VDC		
V 7	6AG5	SEE NOTE #1								
V 8	6AL5	.3VDC	-2.5VDC	6.3VAC	0V.	-1.2VDC	0V.	0V.		
V 9	6AC7	0V.	6.3VAC	0V.	-2.2VDC	-V.	157VDC	0V.	220VDC	
V 10	6AU6	-.1VDC	0V.	0V.	6.3VAC	280VDC	143VDC	.8VDC		
V 11	6AU6	-.2VDC	0V.	0V.	6.3VAC	280VDC	43VDC	.1VDC		
V 12	6AL5	0V.	-5VDC	0V.	6.3VAC	0V.	0V.	-.4VDC		
V 13	6SJ7GT	0V.	0V.	0V.	-.5VDC	0V.	50VDC	6.3VAC	193VDC	
V 14	6V6GT	0V.	6.3VAC	220VDC	235VDC	-7.1VDC	-11VDC	0V.	0V.	
V 15	6SN7GT	-.4VDC	18VDC	0V.	-35VDC	47VDC	0V.	0V.	6.3VAC	
V 16	6SJ7GT	0V.	0V.	0V.	-.3VDC	0V.	43VDC	6.3VAC	280VDC	
V 17	6SN7GT	-29VDC	107VDC 205VDC	0V.	0V.	128VDC	6VDC	0V.	6.3VAC	
V 18	6SN7GT	0V.	370VDC	12VDC 17VDC	0V.	370VDC	12VDC 17VDC	6.3VAC	0V.	
V 19	6AL5	1.9VDC	-1.3VDC	0V.	6.3VAC	.4VDC	0V.	-.8VDC		
V 20	6AC7	0V.	0V.	0V.	-.8VDC	0V.	85VDC	6.3VAC	225VDC	
V 21	6K6GT	0V.	0V.	200VDC	200VDC	-37VDC	290VDC	6.3VAC	.6VDC	
V 22	6BG6G	0V.	0V.	¶9.1VDC	¶-1.3VDC	¶-1.2VDC	¶410VDC	6.3VAC	¶260VDC	TOP CAP *
V 23	5V4G	75VDC	480VDC	280VDC	400VDC	400VDC	400VDC	365VDC	480VDC	
V 24	1B3GT	* DO NOT MEASURE.								
V 25	6AL5	42VDC	-11VDC	.2VAC	6.3VAC	42VDC	0V.	-12VDC		
V 26	5U4G	-13VDC	430VDC	0V.	380VAC	-11VDC	380VAC	400VDC	430VDC	
V 27	5U4G	0V.	430VDC	0V.	380VAC	0V.	380VAC	0V.	430VDC	
V 28	12QP4	0V.	.1VDC	PIN 10 280VDC	PIN 11 75VDC	PIN 12 6.3VAC				

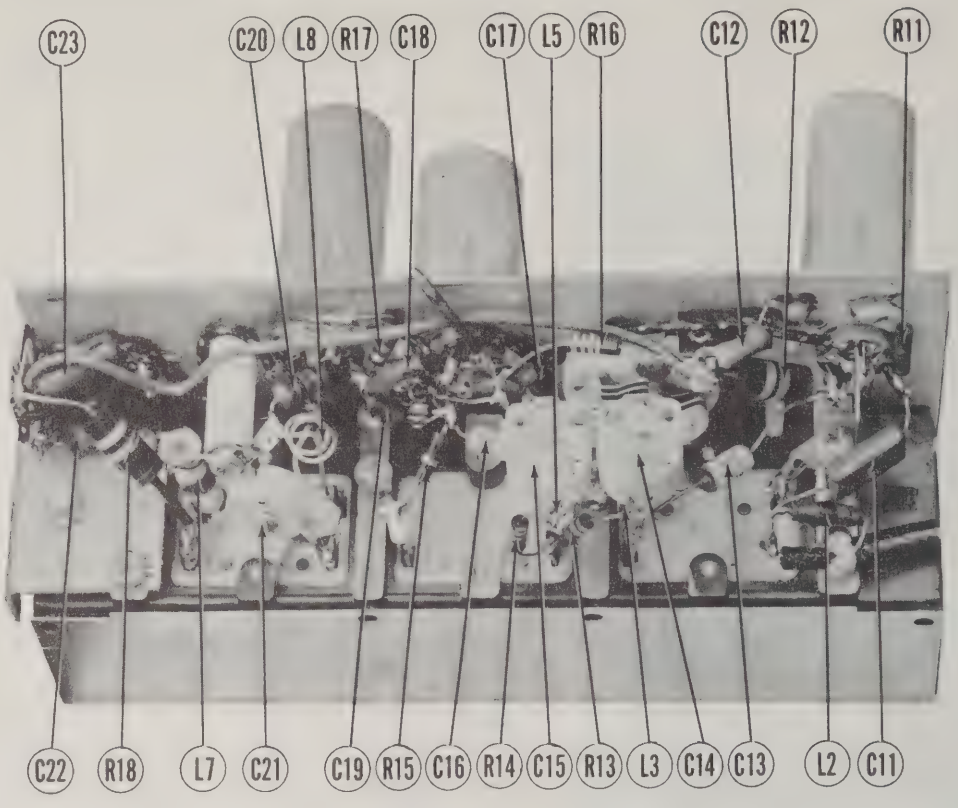
¶ MEASURED FROM THE JUNCTION OF R116 AND C86.
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE
NOTE #1: USED IN MODELS 9-419M1-LD and 9-419M3-LD ONLY.
NOTE #2: CONTRAST CONTROL SET AT MAXIMUM FOR THESE MEASUREMENTS.

RESISTANCE READINGS

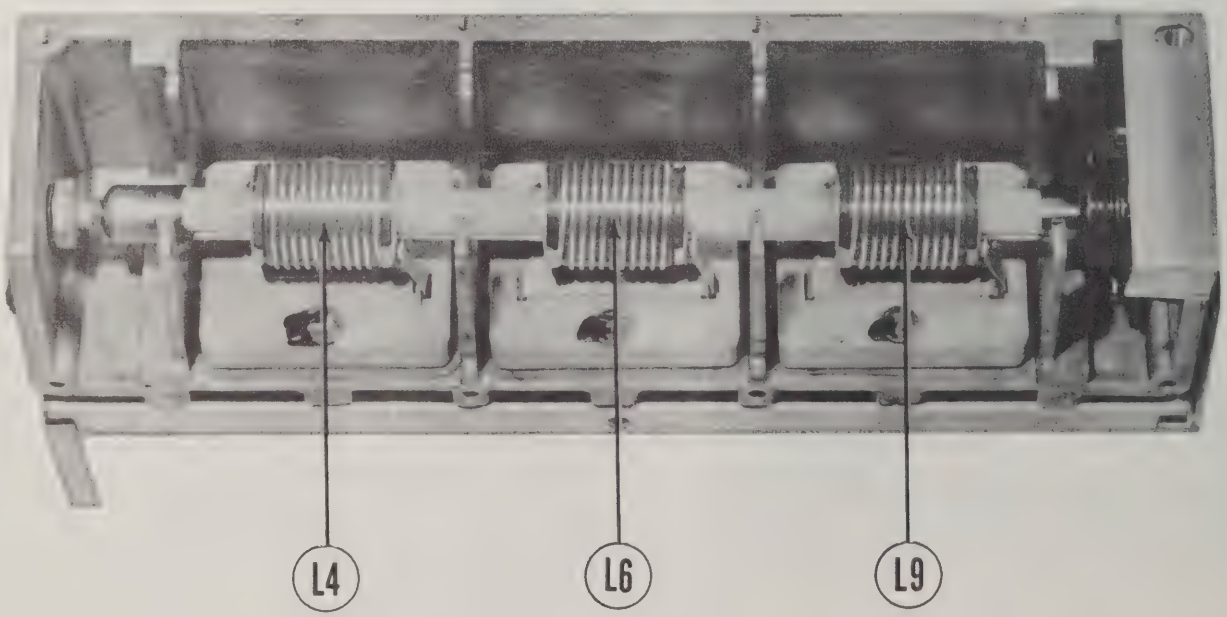
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6J6	†17KΩ	†17KΩ	0Ω	.1Ω	0Ω	0Ω	200Ω		
V 2	6AK5	1 Meg.	0Ω	0Ω	.1Ω	†55KΩ	†330KΩ	0Ω		
V 3	6AB4	†17KΩ	0Ω	.1Ω	0Ω	0Ω	12KΩ	0Ω		
V 4	6AG5	1 Meg.	68Ω	.1Ω	0Ω	†12.5KΩ	†12.5KΩ	68Ω		
V 5	6AG5	1 Meg.	68Ω	.1Ω	0Ω	†7.5KΩ	†7.5KΩ	68Ω		
V 6	6AG5	1Ω	100Ω	.1Ω	0Ω	†7.5KΩ	†7.5KΩ	100Ω		
V 7	6AG5	SEE NOTE #1.								
V 8	6AL5	150KΩ	37Ω	.1Ω	0Ω	4.7KΩ	0Ω	10KΩ		
V 9	6AC7	0Ω	.1Ω	0Ω	4.7KΩ	0Ω	†52KΩ	0Ω	†8KΩ	
V 10	6AU6	250KΩ	0Ω	0Ω	.1Ω	†2.5KΩ	†35KΩ	68Ω		
V 11	6AU6	56KΩ	0Ω	0Ω	.1Ω	†2.5KΩ	†14KΩ	68Ω		
V 12	6AL5	0Ω	100KΩ	0Ω	.1Ω	200KΩ	0Ω	100KΩ		
V 13	6SJ7GT	0Ω	0Ω	0Ω	570KΩ	0Ω	†1 Meg.	.1Ω	†100KΩ	
V 14	6V6GT	0Ω	.1Ω	†2.4KΩ	†2.3KΩ	100KΩ	58Ω	0Ω	0Ω	
V 15	6SN7GT	39KΩ	†16KΩ	0Ω	220KΩ	†680KΩ	0Ω	0Ω	.1Ω	
V 16	6SJ7GT	0Ω	0Ω	0Ω	1.2Meg.	0Ω	†25KΩ	.1Ω	†11KΩ	
V 17	6SN7GT	1 Meg. 560KΩ	†2.5 Meg. †500KΩ	0Ω	1.2 Meg.	†34KΩ	6.8KΩ	0Ω	.1Ω	
V 18	6SN7GT	2.2 Meg.	†7KΩ	2.5 KΩ 820Ω	2.2 Meg.	†7KΩ	2.5KΩ 820Ω	.1Ω	0Ω	
V 19	6AL5	470KΩ	22Ω	0Ω	.1Ω	470KΩ	Inf.	1 Meg.		
V 20	6AC7	0Ω	0Ω	0Ω	1.5 Meg.	10Ω	†20KΩ	.1Ω	†23KΩ	
V 21	6K6GT	0Ω	0Ω	†6KΩ	†11KΩ	47KΩ	†650Ω	.1Ω	22Ω	
V 22	6BG6G	0Ω	0Ω	¶100Ω	¶470KΩ	¶470KΩ	†100Ω	.1Ω	†13KΩ	TOP CAP †9KΩ
V 23	5V4G	65KΩ	†8.5KΩ	†650Ω	†100Ω	†100Ω	†100Ω	†300Ω	†8.5KΩ	
V 24	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP †9KΩ
V 25	6AL5	5KΩ	60Ω	1.5Ω	.1Ω	5KΩ	Inf.	60Ω		
V 26	5U4G	30Ω	7KΩ	Inf.	78Ω	58Ω	76Ω	7KΩ	7KΩ	
V 27	5U4G	Inf.	7KΩ	Inf.	78Ω	Inf.	76Ω	Inf.	7KΩ	
V 28	12QP4	0Ω	720KΩ	PIN 10 †650Ω	PIN 11 †70KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V27.
¶ MEASURED FROM JUNCTION OF R116. AND C86.
NOTE #1: USED ONLY IN MODELS 9-419M1-LD and 9-419M3-LD.

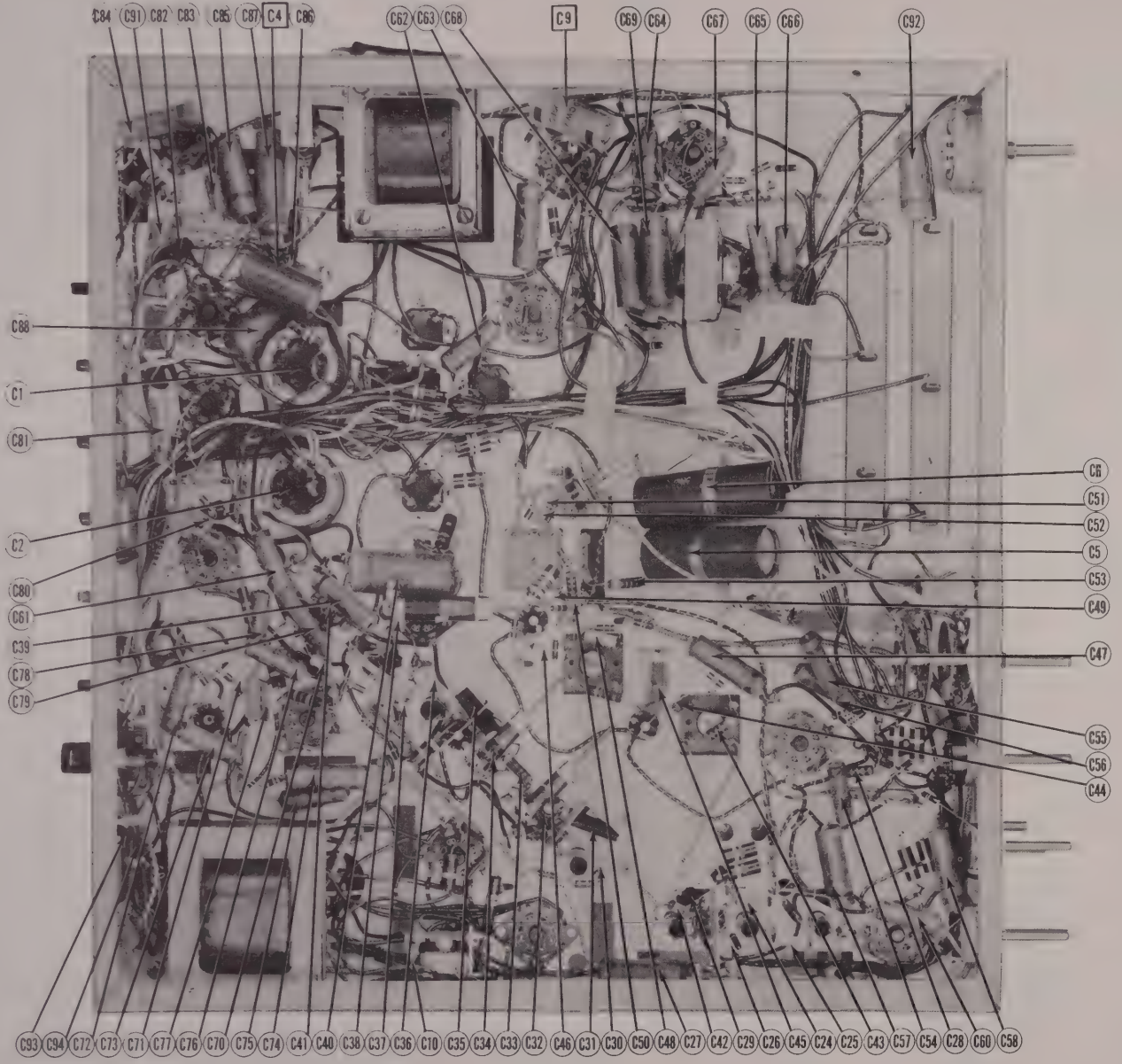
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



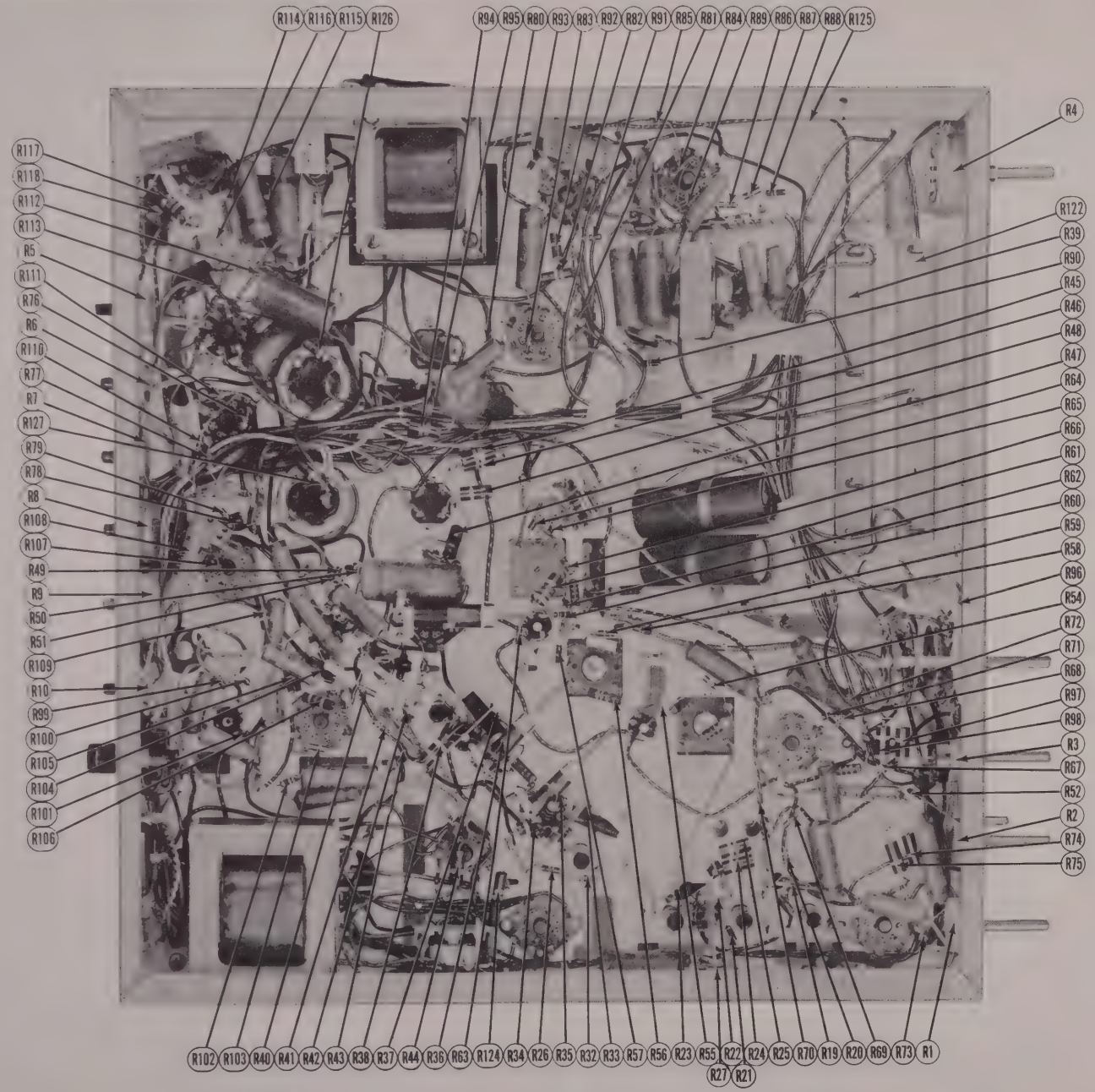
TV-RF TUNER



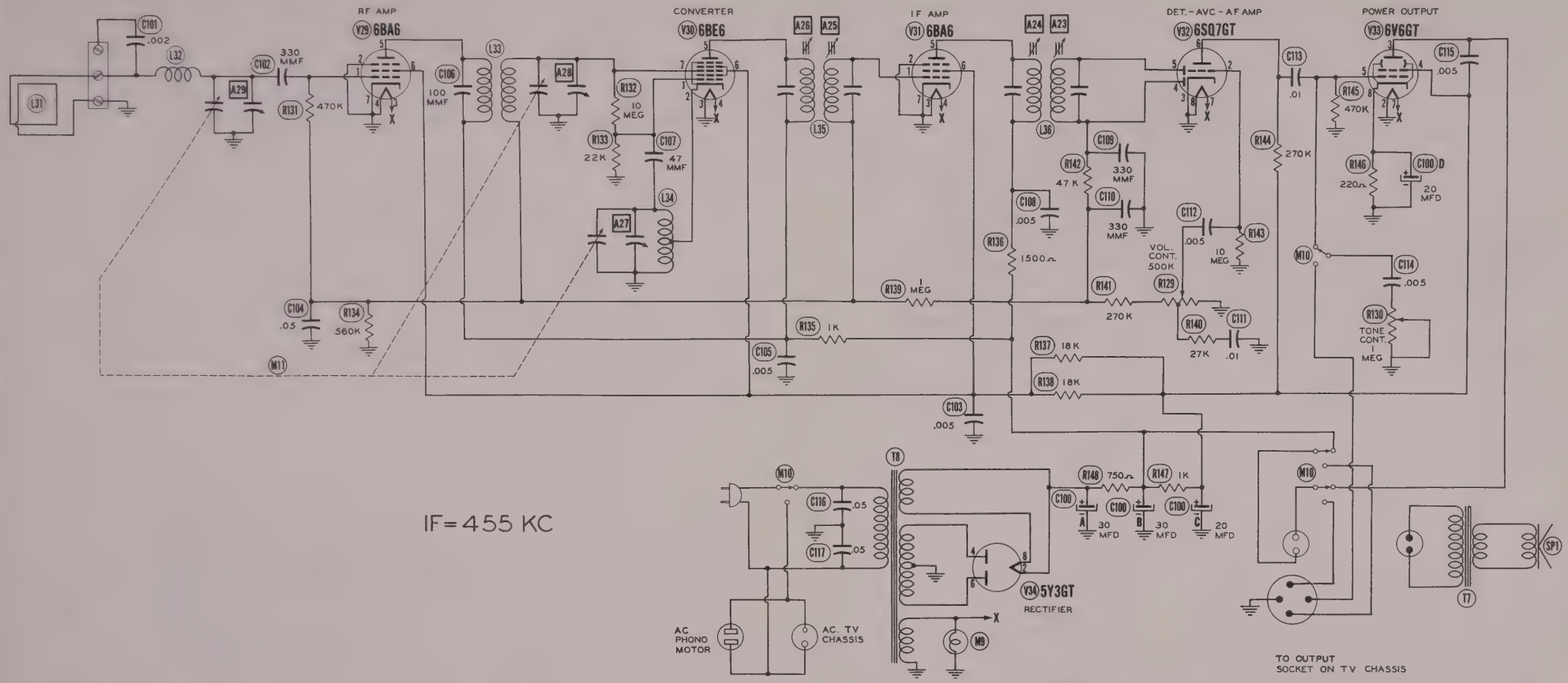
TV-RF TUNER



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V29	6BA6	-3VDC	0V.	6.3VAC	0V.	270VDC	95VDC	0V.	
V30	6BE6	§-8.5VDC	0V.	0V.	6.3VAC	260VDC	95VDC	-.4VDC	
V31	6BA6	-.4VDC	0V.	0V.	6.3VAC	270VDC	95VDC	0V.	
V32	6SQ7GT	0V.	-.7VDC	0V.	-.6VDC	-.6VDC	107VDC	6.3VAC	0V.
V33	6V6GT	0V.	0V.	265VDC	260VDC	0V.	0V.	6.3VAC	11VDC
V34	5Y3GT	0V.	360VDC	0V.	340VAC	0V.	340VAC	0V.	360VDC

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V29	6BA6	1 Meg.	0Ω	.1Ω	0Ω	≈1.8KΩ	≈11KΩ	0Ω	
V30	6BE6	20KΩ	1.5Ω	0Ω	.1Ω	≈1.8KΩ	≈11KΩ	450KΩ	
V31	6BA6	420KΩ	0Ω	0Ω	.1Ω	≈2.2KΩ	≈11KΩ	0Ω	
V32	6SQ7GT	0Ω	10 Meg.	0Ω	600KΩ	600KΩ	≈270KΩ	.1Ω	0Ω
V33	6V6GT	0Ω	0Ω	≈1000Ω	≈1.8KΩ	500KΩ	Inf.	.1Ω	220Ω
V34	5Y3GT	Inf.	120KΩ	Inf.	175Ω	Inf.	175Ω	Inf.	120KΩ

* MEASURED FROM PIN 2 OF V34.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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A PHOTOFACT STANDARD NOTATION SCHEMATIC

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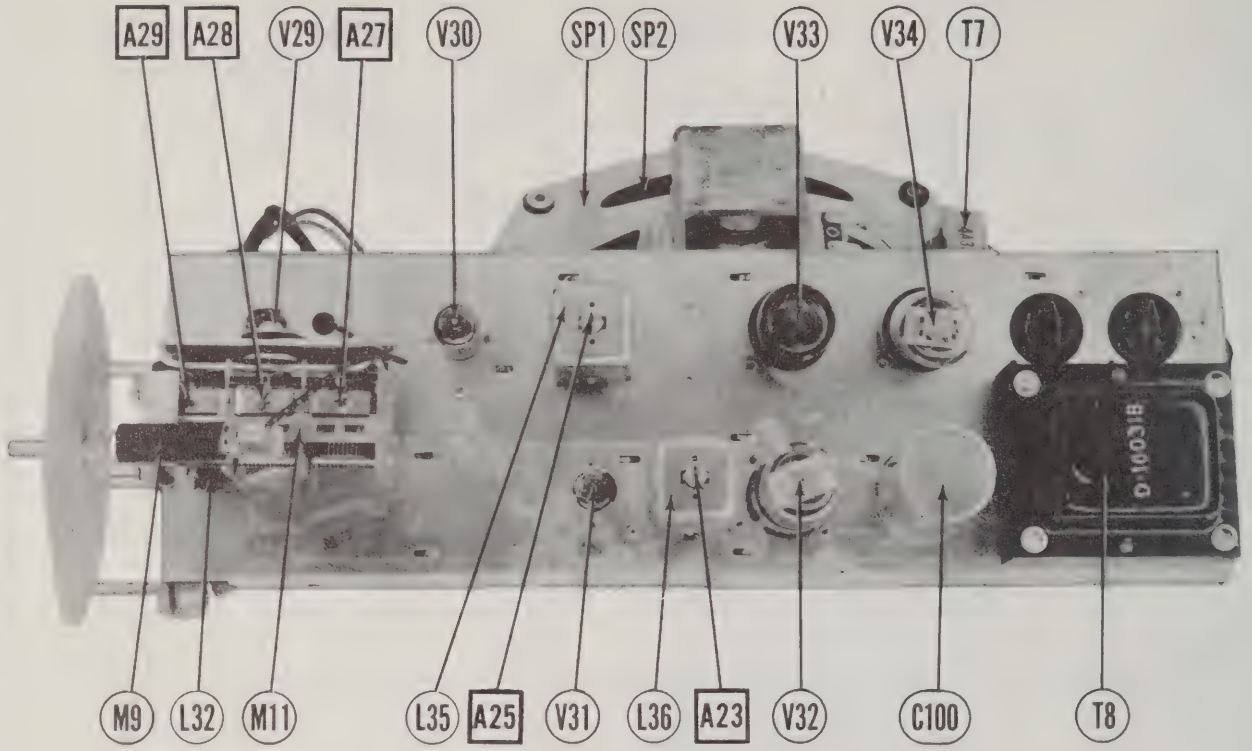
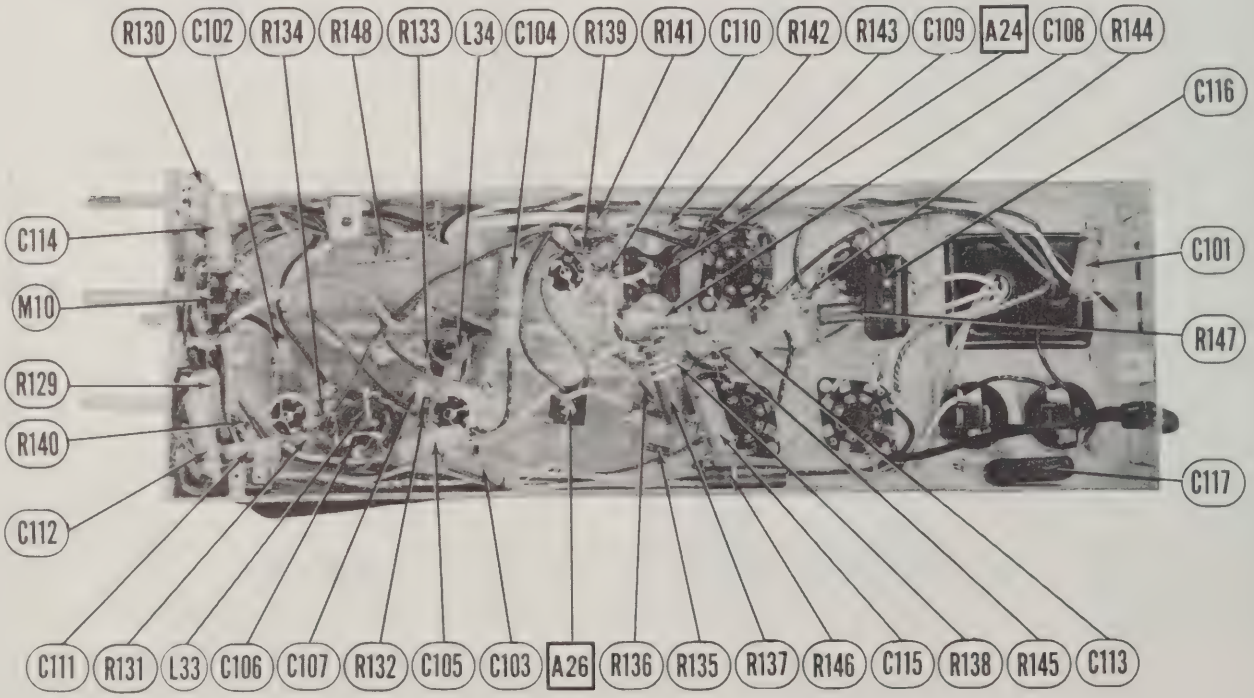
RADIO SCHEMATIC



RADIO CHASSIS-TOP VIEW



RADIO CHASSIS-BOTTOM VIEW

TV PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
V1	RF Amp.	6J6	6J6	7BF	
V2	Mixer	6AK5	6AK5	7BD	
V3A	Oscillator	6AB4	6AB4	5CE	
B	Oscillator	6J6	6J6	7BF	
V4A	1st Video IF	6AG5	6AG5	7BD	
B	1st Video IF	6AU6	6AU6	7BK	Models 9-419M1-LD, 9-419M3-LD
V5	2nd Video IF	6AG5	6AG5	7BD	
V6	3rd Video IF	6AG5	6AG5	7BD	
V7	IF Amp.	6AU6	6AU6	7BK	Model 9-419M1-LD, 9-419M3-LD
V8	Video Det.-DC Restorer	6AL5	6AL5	6BT	
V9	Video Amp.	6AC7	6AC7	8N	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Limiter	6AU6	6AU6	7BK	
V12	Disc.	6AL5	6AL5	6BT	
V13	AF Amp.	6SJ7GT	6SJ7GT	8N	
V14	Audio Output	6V6GT	6V6GT	7AC	
V15	1st Sync. Clipper -Hor. Disch	6SN7GT	6SN7GT	8BD	
V16	2nd Sync. Clipper	6SJ7GT	6SJ7GT	8N	
V17	Vert. Buffer-Vert. Osc.-Vert. Disch.	6SN7GT	6SN7GT	8BD	
V18	Vert. Amp.	6SN7GT	6SN7GT	8BD	
V19	Hor. Sync. Disc.	6AL5	6AL5	6BT	
V20	Hor. AFC	6AC7	6AC7	8N	
V21	Hor. Osc.	6K6GT	6K6GT	7S	
V22	Hor. Output	6BG6G	6BG6G	5BT	
V23	Damper	5V4G	5V4G	5L	
V24	HV Rectifier	1B3GT	1B3GT	3C	
V25	Time Delay Rect.	6AL5	6AL5	6BT	
V26	LV Rectifier	5U4G	5U4G	5T	
V27	LV Rectifier	5U4G	5U4G	5T	
V28A	Picture Tube	12QP4	12QP4	12D	
B	Picture Tube	12KP4	12KP4	12D	
C	Picture Tube	12TP4	12TP4	12D	
D	Picture Tube	12LP4	12LP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	80	350	W-160039	AFH16H			TVL-5	Filter
C2	80	350	W-160039	AFH16H			TVL-5	Filter
C3A	40	475	B-160549	AFH8K8I			TVL-20	▬ Filter
B	40	400						▲ Filter
C4	100	25	W-160073	PRS25/100			TVA-8	Hor. Cent. Cont. Bypass
C5	500	25	W-160071	PRS25/500			TVA-10	Bias Filter
C6	1.5Ω @60∿	4	W-160070	PRS6/2000			TVA-2	Vert. Cent. Cont. Bypass
C7A	10	350	W-160076	AF2222J			TVL-34	▬ V. Amp. Screen Bypass
B	10	350						■ Low Pass Filter
C	10	300						▲ 1st Sync. Clipper Dec. Decoupling
D	10	300						
C8A	30	450	W-160074	AF62J			TVL-15	▬ Decoupling
B	10	450						▲ Output Decoupling
C9	25	50	W-160075	PRS50/25			TVA-15	Vert. Output Cath. Bypass
C10	4	150	W-160036	PRS150/4			UT-41	Filter
C11	470		W-160633-20	GP470M	D6-471	GP2K-470		RF Coupling
C12	470		W-160633-20	GP470M	D6-471	GP2K-470		RF Bypass
C13	15		W-160080	CI15JNPO	D2-15	NPOK-15		RF Coupling
C14	3-12		W-160247			557-NPO-3-12		Variable Trimmer
C15	3-12		W-160247			557-NPO-3-12		Variable Trimmer
C16	15		W-160080	CI15JNPO	D2-15	NPOK-15		RF Coupling
C17	470		W-160082	GP470M	D6-471	GP2K-470		Mixer Screen Bypass
C18	470		W-160082	GP470M	D6-471	GP2K-470		Mixer Filament Bypass
C19	1		W-137398-2		D2-1			Osc. Coupling
C20	5		W-160084	CI5JN030	D2-4.7	NPOK-5		Osc. Grid Cap.
C21	2-12		W-160247			TS2AN500-3-12		Variable Trimmer
C22	470		W-160082	GP470M	D6-471	GP2K-470		Osc. Filament Bypass
C23	470		W-160082	GP470M	D6-471	GP2K-470		RF Bypass
C24	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	Mixer Plate Decoupling
C25	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	IF Coupling †
C26	6800		W-160067	GP6800M	D6-682	GP2-334-0068	1FM-27	Bias Filter
C27	.25	200	39001-87	P488-25			TC-2	Bias Filter
C28	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	RF Bypass
C29	6800		W-160067	GP6800M	D6-682	GP2-334-0068	1FM-27	1st V. IF Decoupling
C30	6800		W-160067	GP6800M	D6-682	GP2-334-0068	1FM-27	Bias Filter §
C31	6800		W-160067	GP6800M	D6-682	GP2-334-0068	1FM-27	2nd V. IF Decoupling
C32	20		W-160037	CI20KNPO	D2-20	NPOK-20	MS-42	Fixed Trimmer
C33	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	IF Coupling
C34	10		W-160083	CI10FNPO	D2-10	NPOK-10	MS-41	Fixed Trimmer
C35	6800		W-160067	GP6800M	D6-682	GP2-334-0068	1FM-27	3rd V. IF Cath. Bypass
C36	6800		W-160067	GP6800M	D6-682	GP2-334-0068	1FM-27	3rd V. IF Decoupling
C37	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	Bias Filter
C38	47		W-160081	CI47KNPO	D2-47	NPOM-50	MS-45	Fixed Trimmer
C39	.05	400	39001-17	P488-05				Video Coupling
C40	.5	400	39001-23	P488-5				Video Coupling
C41	270		W-160079	GP270M	D6-271	GP2K-270	1FM-325	DC Res. Plate Bypass
C42	2.5		W-160078	CI2.5CNPO	D2-2.2	NPOK-2.5		S. IF Coupling
C43	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	AVC Filter
C44	25			CI25JNPO	D2-25	NPOL-25	MS-425	S. IF Feedback
C45	4700	500	W-160636-14	1467-005	D6-472	GP2M-0047	1FM-25	1st S. IF Screen Bypass
C46	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	1st S. IF Decoupling
C47	.1	200	39001-19	P288-1			TM-1	Bias Filter
C48	47		W-160109	CI47KNPO	D6-470	GP1K-47	1FM-45	Limiter Grid Filter
C49	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	Limiter Screen Bypass
C50	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	Limiter Decoupling
C51	47		W-160109	GP47K	D6-470	GP1K-47	1FM-45	RF Bypass
C52	47		W-160109	GP47K	D6-470	GP1K-47	1FM-45	RF Bypass
C53	1000		W-160034	GP1000M	D6-102	GP2L-001	1FM-21	De-emphasis

TV PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No	RATING CAP.	RATING VOLT	REPLACEMENT DATA CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C54	.01	400	39001-13	P488-01	D6-103	821-01	TM-11	Tone Compensation
C55	.02	400	39001-60	P488-02			TM-12	Audio Coupling
C56	.1	200	39001-19	P288-1			TM-1	Bias Filter
C57	.1	400	39001-19	P488-1			TM-1	AF Amp. Screen Bypass
C58	.05	400	39001-17	P488-05			TM-15	Audio Coupling
C59	.002	600		P688-002	D6-202	GP2M-002	TM-22	Output Grid Bypass *
C60	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Output Plate Bypass
C64	.01	400	39001-13	P488-01	D6-103	821-01	TM-11	Sync. Coupling
C62	.05	200	39001-17	P288-05			TM-15	Sync. Coupling
C63	.1	200	39001-19	P288-1			TM-1	2nd Sync. Clipper Screen Byp
C64	.01	600	39001-13	P688-01	D6-103	821-01	TM-11	Vert. Sync. Coupling
C65	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Integrator Net.
C66	.01	400	39001-13	P488-01	D6-103	821-01	TM-11	Integrator Net.
C67	.01	400	B-146434-1	P488-01	D6-103	821-01	TM-11	Vert. Osc. Grid Cap.
C68	.1	400	160643-5	P488-1			TM-1	Vert. Discharge
C69	.1	400	39001-19	P488-1			TM-1	Vert. Sweep Coupling
C70	6800		W-160067	GP6800M	D6-682	GP2-334-0068	IFM-27	RF Bypass
C71	47		W-160035	C147JNPO	D2-47	NPOM-50	MS-45	Hor. Sync. Coupling
C72	.01	400	W-160643-4	P488-01	D6-103	821-01	TM-11	Fixed Trimmer
C73	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	AFC Filter
C74	.1	200	39001-19	P288-1			TM-1	AFC Filter
C75	.05	200	39001-17	P288-05			TM-15	Hor. AFC Screen Bypass
C76	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Hor. AFC Coupling
C77	10000	300	W-160635-18	1467-01	D6-103	821-01	IFM-11	Phase Shifter
C78	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Hor. Osc. Grid Cap.
C79	.05	400	39001-17	P488-05			TM-15	Hor. Osc. Screen Bypass
C80	330	500	W-160632-26		D6-331	GP2K-330		Differentiator Net.
C81	.01	400	39001-13	P488-01	D6-103	821-01	TM-11	Hor. Sweep Coupling
C82	680	500	W-160634-3		D6-681	GP2K-680	MS-37	Hor. Discharge
C83	1000	500	W-160634-5	1467-001	D6-102	GP2L-001	IFM-21	Hor. Sweep Coupling
C84	.05	400	39001-17	P488-05			TM-15	Hor. Output Screen Bypass
C85	.1	200	39001-19	P288-1			TM-1	Hor. Output Cath. Bypass
C86	1000		W-160034	GP1000M	D6-102	GP2L-001	IFM-21	RF Bypass
C87	035	1000	W-160643-1	P1088-033				Damper Filter
C88	05	1000	W-160643-2	P1088-05			TR-16	Damper Filter
C89	220	1500	W-160111					Fixed Trimmer
C90	500	10000	B-137477-1	EV-500		TV1-501	410-500	HV Filter
C91	.1	200	39001-19	P288-1			TM-1	Pix. Tube Cath. Bypass
C92	.1	400	39001-19	P488-1			TM-1	RF Bypass
C93	.05	600	39001-17	P688-05			TM-15	Line Filter
C94	.05	600	39001-17	P688-05			TM-15	Line Filter
C95	5000		C-144675-2	BPD-5	D6-502	811-005	29C1	RF Bypass †
C96	5000		C-144675-2	BPD-5	D6-502	811-005	29C1	2nd V. IF Cath. Bypass †
C97	5000		C-144675-2	BPD-5	D6-502	811-005	29C1	RF Bypass †
C98	100		C-137727-1	GP100M	D6-101	GP1K-100	IFM-31	IF Coupling †
C99	5000		C-144675-2	BPD-5	D6-502	811-005	29C1	1st V. IF Decoupling †

* Not used in all models.
† Used only in models 9-419M1-LD and 9-419M3-LD.
¶ Models 9-419M1-LD and 9-419M3-LD uses 100MMF in this application.
‡ Models 9-419M1-LD and 9-419M3-LD uses 1000MMF in this application.

CONTROLS

ITEM No	RATING RESIST-ANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1	25KΩ	1	W-160032	Q11-120	M-40-S	B-26	Contrast control
R2	100KΩ	1	W-160092-2	Q11-128	M-49-S	B-40	Brightness control
R3A	500KΩ	1	W-160031	Q13-133X	T-78	BT-67-S	Volume control, tapped Ⓐ 150KΩ
B	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R3A per instructions
R4	1000Ω	25	W-160091-2	PR-25-1000	PW-25-1000		Focus control-Wire Wound
R5	200KΩ	1	W-160094-1	Q11-119	M-36-S	B-22	Horiz. drive control
R6	500KΩ	1	W-160094-2	Q11-133	M-58-S	B-50	Vert. hold control
R7	2 Meg.	1	W-160094-3	Q11-139	M-83-S	B-75	Vert. size control
R8	1500Ω	2	W-160086	W-2000	43-2000	V-131	Vert. linearity control-Wire Wound-See note 1
R9	25Ω	4	W-160089		10-25		Horiz. centering control Wire Wound
R10	25Ω	2	W-160095-1	W-25	43-25	V-111	Vert. centering control-Wire Wound

Note 1. Some models use 1500Ω control Part No. W160087.

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R11	200Ω 5%	1	39375-32		RF Cathode
R12	10KΩ	2	39374-213		RF Plate
R13	12KΩ	1	39374-38		RF Plate Coil Shunt
R14	12KΩ	1	39374-38		Mixer Grid Coil Shunt
R15	1 Meg.	1	39374-61		Mixer Grid
R16	330KΩ	1	39374-55		Mixer Screen
R17	12KΩ	½	39374-38		Osc. Grid
R18	10KΩ	2	39374-213		Osc. Plate
R19	8200Ω 5%	1	39375-71		1st Video IF Transformer Shunt-See Note 2
R20	47KΩ	1	39374-45		Mixer Plate Decoupling
R21	5600Ω 5%	1	39375-67		1st Video IF Grid-See Note 3
R22	68Ω	1	39374-11		1st Video IF Cathode-See Note 4
R23	6800Ω	1	39374-35		2nd Video IF Coil Shunt-See Note 5
R24	22KΩ	2	39374-217		1st Video IF Decoupling
R25	22KΩ	2	39374-217		1st Video IF Decoupling
R26	10KΩ	1	39374-37	BTS-10K	Bias Network
R27	1 Meg. 20%	1	39375-92	BTS-1 Meg.	Bias Network
R28	3900Ω	1	39375-63		1st Video IF Grid-See Note 6
R29	82Ω	1	39374-12		1st Video IF Cathode-See Note 6
R30	470Ω	1	39374-21		1st Video IF Decoupling-See Note 6
R31	100KΩ	1	39374-49	BTS-100K	Bias Network-See Note 6
R32	6800Ω 5%	1	39375-69		2nd Video IF Coil Shunt-See Note 5
R33	68Ω	½	39374-11		2nd Video IF Cathode
R34	3900Ω	2	39374-208	BT-2-3900	2nd Video IF Decoupling
R35	10KΩ	½	39374-37		3rd Video IF Coil Shunt
R36	3900Ω	½	39374-32	BTS-3900	3rd Video IF Coil Shunt
R37	100Ω	½	39374-13		3rd Video IF Cathode
R38	3900Ω	2	39374-208	BT-2-3900	3rd Video IF Decoupling

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
R39A	2000Ω	7			Bleeder-Wire Wound
B	2500Ω	9.6	W-160195		Voltage Dropping-Wire Wound
C	62Ω	2			Voltage Divider-Wire Wound
R40	39KΩ 5%	½	39375-87		4th Video IF Coil Shunt
R41	4700Ω 5%	½	39375-65	BTS-4700-5%	Video Det. Diode Load
R42	22Ω	½	39374-5	BW-½-22	Voltage Divider
R43	15Ω	½	39374-3	BW-½-15	Bias Network
R44	120Ω	2	39374-190	BW-2-120	Bias Network
R45	100KΩ	2	39374-225	BT-2-100K	Video Amp. Screen
R46	100KΩ	2	39374-225	BT-2-100K	Video Amp. Screen
R47	3600Ω 5%	2	39375-358		Video Amp. Plate
R48	3300Ω	2	39374-207	BT-2-3300	Low Pass Filter
R49	10KΩ	½	39374-37	BTS-10K	DC Rest. Load
R50	150KΩ	½	39374-51	BTS-150K	Voltage Divider
R51	470KΩ	½	39374-57	BTS-470K	Picture Tube Grid
R52	220KΩ	½	39374-53	BTS-220K	Voltage Divider
R53	22KΩ	½	39374-41	BTS-22K	Voltage Divider-See Note 7
R54	100KΩ	½	39374-49		Sound IF Grid
R55	68Ω	½	39374-11		Sound IF Cathode
R56	33KΩ	½	39374-131		Sound IF Screen
R57	1000Ω	½	39374-25	BTS-1000	Sound IF Decoupling
R58	100KΩ	½	39374-49		Sound IF Grid Filter
R59	56KΩ	½	39374-46		Limiter Grid
R60	68Ω	½	39374-11		Limiter Cathode
R61	47KΩ	2	39374-221		Limiter Screen
R62	1000Ω	½	39374-25	BTS-1000	Limiter Decoupling
R63	10KΩ	½	39374-37	BTS-10K	Voltage Divider
R64	100KΩ	½	39374-49	BTS-100K	Disc. Diode Load
R65	100KΩ	½	39374-49	BTS-100K	Disc. Diode Load
R66	27KΩ	½	39374-42	BTS-27K	De-emphasis
R67	22KΩ	½	39374-41	BTS-22K	Tone Compensation
R68	470KΩ	½	39374-57	BTS-470K	AF Amp. Grid
R69	1 Meg.	½	39374-61	BTS-1 Meg.	AF Amp. Screen
R70	100KΩ	½	39374-49	BTS-100K	AF Amp. Plate
R71	100KΩ	½	39374-49	BTS-100K	Voltage Divider
R72	470KΩ	½	39374-57	BTS-470K	Bias Network
R73	100KΩ	½	39374-49	BTS-100K	Output Grid
R74	2200Ω	2	39374-205	BT-2-2200	Output Decoupling
R75	2200Ω	2	39374-205	BT-2-2200	Output Decoupling
R76	39KΩ	½	39374-44	BTS-39K	1st Sync. Clipper Grid
R77	3300Ω	½	39374-31	BTS-3300	1st Sync. Clipper Plate
R78	33KΩ	2	39374-219	BT-2-33K	1st Sync. Clipper Plate Decoupling
R79	6800Ω	½	39374-35	BTS-6800	Voltage Divider
R80	1.2 Meg.	½	39374-63	BTS-1.2 Meg.	2nd Sync. Clipper Grid
R81	10KΩ	½	39374-37	BTS-10K	2nd Sync. Clipper Plate
R82	100KΩ	½	39374-137	BTA-100K	2nd Sync. Clipper Screen
R83	22KΩ	½	39374-41	BTS-22K	Voltage Divider
R84	1.2 Meg.	½	39374-63	BTS-1.2 Meg.	Vert. Buffer Grid
R85	6800Ω	½	39374-35	BTS-6800	Vert. Buffer Cathode
R86	10KΩ	½	39374-37	BTS-10K	Integrator Network
R87	10KΩ	½	39374-37	BTS-10K	Integrator Network
R88	10KΩ	½	39374-37	BTS-10K	Integrator Network
R89	560KΩ	½	39374-58	BTS-560K	Vert. Osc. Grid
R90	470KΩ	½	39374-57	BTS-470K	Vert. Osc. Plate
R91	3900Ω	½	39374-32	BTS-3900	Vert. Peaking
R92	820Ω	1	39374-112	BTA-820	Vert. Amp. Cathode
R93	2.2 Meg.	½	39374-69	BTS-2.2 Meg.	Vert. Amp. Grid
R94	10KΩ	2	39374-213	BT-2-10K	Decoupling
R95	10KΩ	2	39374-213	BT-2-10K	Decoupling
R96	330Ω	1	39374-107	BTA-330	Bias Network
R97	8200Ω	2	39374-212	BT-2-8200	Voltage Dropping
R98	8200Ω	2	39374-212	BT-2-8200	Voltage Dropping
R99	470KΩ	½	39374-57	BTS-470K	Horiz. Sync. Disc. Load
R100	470KΩ	½	39374-57	BTS-470K	Horiz. Sync. Disc. Load
R101	470KΩ	½	39374-57	BTS-470K	Horiz. AFC Filter Network
R102	470Ω	½	39374-21	BTS-470	Horiz. AFC Grid
R103	10Ω	½	39374-1		Horiz. AFC Cathode
R104	22KΩ	2	39374-217	BT-2-22K	Horiz. AFC Plate
R105	47KΩ	2	39374-221	BT-2-47K	Horiz. AFC Screen
R106	27KΩ	1	39374-130	BTA-27K	Voltage Divider
R107	47KΩ	½	39374-45	BTS-47K	Horiz. Osc. Grid
R108	5000Ω	10	W-160104-16	AB-5000	Horiz. Osc. Plate-Wire Wound
R109	10KΩ	½	39374-125	BTA-10K	Horiz. Osc. Screen
R110	6800Ω	½	39374-35	BTS-6800	Differentiator
R111	220KΩ	½	39374-53	BTS-220K	Horiz. Discharge Grid
R112	680KΩ	½	39374-59	BTS-680K	Horiz. Discharge Plate
R113	680Ω	½	39374-35	BTS-6800	Horiz. Peaking
R114	100Ω	½	39374-13		Parasitic Supp.
R115	470KΩ	½	39374-57	BTS-470K	Horiz. Output Grid
R116	100Ω	5	W-160097-3	AB-100	Horiz. Output Cathode-Wire Wound
R117	27KΩ	2	39374-218	BT-2-27K	Horiz. Output Screen
R118	22KΩ	2	39374-217	BT-2-22K	Horiz. Output Screen
R119	8500Ω	25	W-146387		Damper Filter, Wire Wound-tapped Ⓐ 7000Ω
R120	3.6Ω	½	W-160542		HV Rect. Filament-Wire Wound
R121	220KΩ	1	39374-141		HV Filter
R122A	200Ω	11.5	W-160194	DG-200	Series Focus Coil-Wire Wound
B	250Ω	7.7		AB-250	Focus Coil Shunt-Wire Wound
R123	1250Ω	10	138201-6	AB-1250	Focus Coil Shunt-Wire Wound-See Note 8
R124	2.2Ω	1	39304-8	BW-1-2.2	Time Delay Rect. Filament-Wire Wound
R125	1280Ω	25	W-160199		Filter-Wire Wound
R126	100KΩ	1	39374-137	BTA-100K	Bleeder
R127	100KΩ	1	39374-137	BTA-100K	Bleeder
R128	22KΩ	2	39374-217		1st Video IF Decoupling-See Note 6

Note 2. Not used in models 9-419M1-LD, and 9-419M3-LD.
Note 3. Models 9-419M1-LD and 9-419M3-LD use 3300Ω resistor in this application.
Note 4. Models 9-419M1-LD and 9-419M3-LD use 82Ω resistor in this application.
Note 5. Models 9-419M1 -LD and 9-419M3-LD use 4700Ω resistor in this application.
Note 6. Used in models 9-419M1-LD, and 9-419M3-LD only.
Note 7. Used only when using a 12LP4 picture tube.
Note 8. Used only when using a 12KP4 and 12LP4 picture tube.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC Ⓐ 2.25A	750VCT .310ADC & Tap Ⓐ 65VAC .010ADC	5VAC Ⓐ 6A	5VAC Ⓐ 2A SEC. 4 6.3VAC Ⓐ 9.3A	D-160490			

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	290Ω	600Ω SEC. 2 740Ω	D-160015-2				Vert. Block Osc. Trans.
T3	430Ω Tap Ⓐ 180Ω	10.6Ω Tap Ⓐ .6Ω SEC. 2 0Ω	AC-145829	A-8128	HVO-3		Hor. Output Trans.
T4	575Ω	7Ω	W-160200	A-8115	A-3035	TSO-1	Vert. Output Trans.
T5A	14Ω		AB-160455 ④	DY-1	MD-1		Hor. Deflection Coil
B	62Ω						Vert. Deflection Coil
T5			AC-160569 ⑤				Hor.-Vert. Deflection Coil
T6	525Ω		AB-160365				Focus Coil

③ Drill one new mounting hole.
④ Used in models 9-409M3, 9-419M3, and 9-419M3-LD.
⑤ Used in models 9-419M1, 9-419M2, and 9-419M1-LD.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T7	4.3KΩ	3.6Ω	365Ω	.5Ω	138131-2	A-3849	A-3019	RO-9	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	NOTES
	FIELD RES.	V. C. IMP.				
SP1A	PM	3.6Ω	138762-5 ⑥	ST-119 ① MOD. P10-T	10A31	① Replace output transformer to match 6-8Ω voice coil.
B	PM	3.1Ω	145087		57A15	⑥ Used in model 9-409M3
	CONE DIA.	V. C. DIA.				
SP2A	9 3/8"	3/4"				
B	4 3/4" x 7"	3/4"				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ω)	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.310A	70Ω	5 Henry	C-160014	C-1703 ②	C-2996 ②	TR-3300 ②	② Drill new mounting holes.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L2	Ant. Input	0Ω		AW-160018		
L3	RF End					
	Inductor	0Ω		AW-160218		
L4	RF Plate	0Ω				Part of inductuner, Part No. D-144760
L5	RF End					
	Inductor	0Ω		AW-160217		
L6	Mixer Grid	0Ω				Part of inductuner, Part No. D-144760
L7	Osc. Shunt	0Ω		AW-160054		
L8	Osc. End					
	Inductor	0Ω		AW-160225		
L9	Osc. Coil	0Ω				Part of inductuner, Part No. D-144760
L10A	Conv. Trans.	1Ω		AW-145328		Used in model 9-409M3
B	Conv. Trans.			AW-147157		Used in models 9-419M1-LD, 9-419M3-LD
L11	RF Choke	0Ω		AW-160020		Used in model 9-409M3
L12A	1F Coupling	.8Ω		AW-145329		Used in model 9-409M3
B	IF Plate			AW-147146		Used in models 9-419M1-LD, 9-419M3-LD
L13A	1st Video IF	1Ω		AW-145328		Used in model 9-409M3
B	1st Video IF			AW-145329		Used in models 9-419M1-LD, 9-419M3-LD
L14	1st Video IF	.8Ω		AW-145329		
L15	2nd Video IF			AW-145328		
L16	21.9MC Sound Trap	0Ω		AW-145330		
L17	Adjacent Channel Sound Trap	0Ω		AW-145330		
L18	2nd Video IF	1Ω		AW-145329		
L19	3rd Video IF	.8Ω		AW-145328		
L20	3rd Video IF	.8Ω		AW-145328		
L21	Peaking	15Ω		AW-160023-3		Yellow identification dot
L22	Peaking	17.5Ω		AW-160023-2		Red identification dot.
L23	4.5MC Sound Trap	0Ω		AW-160160		
L24	Peaking	10Ω		AW-160023-1		Green identification dot
L25	1st Sound IF	0Ω	0Ω	AC-160008		
L26	2nd Sound IF	0Ω	0Ω	AC-160008		
L27	Disc. Trans.	.5Ω	0Ω	AC-160010		
L28	Horiz. Osc. Trans.	85Ω	88Ω	AC-160009-1		
L29	Width Cont.	.2Ω		AW-160238		
L30	Horiz. Line.	38Ω		AW-160281		

TV PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA CROSLEY PART No.		NOTES
M1	Bayonet	6-8	.25	Blue	138437-8		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M2	RF Tuner	AW-160025	
M3	Fuse	W-160117-11	Type SFE-20A
M4	Fuse	W-145780	Type GJV-.25A
M5	Switch	W-160196	Vert. Positioning
M6	Switch	B-160022	Selector
M7	Relay	W-160044	SPST
M8	Ion Trap	W-145592	
M12	Crystal	W-137449	1N34 Noise Clipper
	Magnet	W-135723	Magnet For 6BG6G
	Cabinet	R-160702	
	Knob	B-160488-1	Small (Plain)
	Knob	B-146459	Large
	Knob	B-160488-2	Small (With indicator line)
	Safety Glass	B-146421-1	

RADIO PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA CROSLEY PART No.	REPLACEMENT DATA STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V29	RF Amp.	6BA6	6BA6	7BK	
V30	Converter	6BE6	6BE6	7CH	
V31	IF Amp.	6BA6	6BA6	7BK	
V32	DET.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
V33	Power Output	6V6GT	6V6GT	7AC	
V34	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C100A	30	450	W-160370	AF862J4A			EL-424	▪ Filter
B	30	450						■ Filter
C	20	450						▲ Filter
D	20	25						Output Cathode Bypass
C101	.002	600		P688-002	D6-202	GP2M-002	TM-22	Ant. Coupling
C102	330		W-160369	1468-00035	D6-331	GP2K-330	1FM-335	RF Coupling
C103	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Decoupling
C104	.05	200	39001-17	P288-05			TM-15	AVC Filter
C105	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Decoupling
C106	100		W-160256	GP100M	D6-101	GP1K-100	1FM-31	Fixed Trimmer
C107	47		W-160081	CI47KNPO	D2-47	GP1K-47	1FM-45	Osc. Grid Cap.
C108	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	IF Plate Decoupling
C109	330		W-160369	GP330M	D6-331	GP2K-330	1FM-335	Diode RF Filter
C110	330		W-160369	GP330M	D6-331	GP2K-330	1FM-335	Diode RF Filter
C111	.01	200	39001-13	P488-01	D6-103	821-01	TM-11	Tone Compensation
C112	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Audio Coupling
C113	.01	600	39001-13	P688-01	D6-103	821-01	TM-11	Audio Coupling
C114	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Tone Compensation
C115	.005	600	39001-11	P688-005	D6-502	811-005	TM-25	Output Plate Bypass
C116	.05	600	39001-17	P688-05			TM-15	Line Filter
C117	.05	600	39001-17	P688-05			TM-15	Line Filter

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R129	500KΩ	½	W-160267	Q13-133X	T-78	BT-67	Volume control, tapped@ 150KΩ
R130	1 Meg.	½	W-160278	Q13-137	M-63-Z	B-60	Tone control

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
R131	470KΩ	½	39373-87	BTS-470K	RF Grid
R132	10 Meg.	½	39373-107	BTS-10 Meg.	Conv. Grid
R133	22KΩ	½	39373-60	BTS-22K	Osc. Grid
R134	560KΩ	½	39374-58	BTS-560	AVC Network
R135	1000Ω	½	39373-33	BTS-1000	Decoupling
R136	1500Ω	½	39373-36	BTS-1500	Decoupling
R137	18KΩ	1	39374-216	BT-2-18K	Screen Dropping
R138	18KΩ	2	39374-216	BT-2 18K	Screen Dropping
R139	1 Meg.	½	39373-92	BTS-1 Meg.	AVC Network
R140	27KΩ	½	39374-42	BTS-27K	Tone Compensation
R141	270KΩ	½	39374-54	BTS-270K	AVC Network
R142	47KΩ	½	39373-67	BTS-47K	Diode Filter
R143	10 Meg.	½	39373-107	BTS-10 Meg.	AF Amp. Grid
R144	270KΩ	½	39374-54	BTS-270K	AF Amp. Plate
R145	470KΩ	½	39374-57	BTS-470K	Output Grid
R146	220Ω	2	39374-193	BW-2-220	Output Cathode
R147	1000Ω	2	39374-201	BW-2-1000	Filter
R148	750Ω	10	160303-24	AB-750	Filter-Wire Wound

RADIO **PARTS LIST AND DESCRIPTIONS (Continued)**

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	CROSLEY PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T8	117VAC ④ .62A	620VCT .088ADC	5VAC ④ 2A	6.3VAC ④ 1.9A	D-160318	P-6012 ⑧	P-2952 ⑧	PH-70

⑧ Add series resistor to reduce plate voltage.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	CROSLEY PART No.	MEISSNER PART No.	
L31	Loop Ant.	0Ω		AB-145446		
L32	Ant. Coil	8.8Ω		AW-160290		
L33	RF Coil	42.5Ω	10Ω	AB-160302	14-1072	
L34	Osc. Coil	6.5Ω		AW-160249	14-1073	
L35	1st IF Trans.	16Ω	16Ω	AC-160306-1	16-6666	
L36	2nd IF Trans.	16Ω	16Ω	AC-160306-2	16-6667	

DIAL LIGHTS

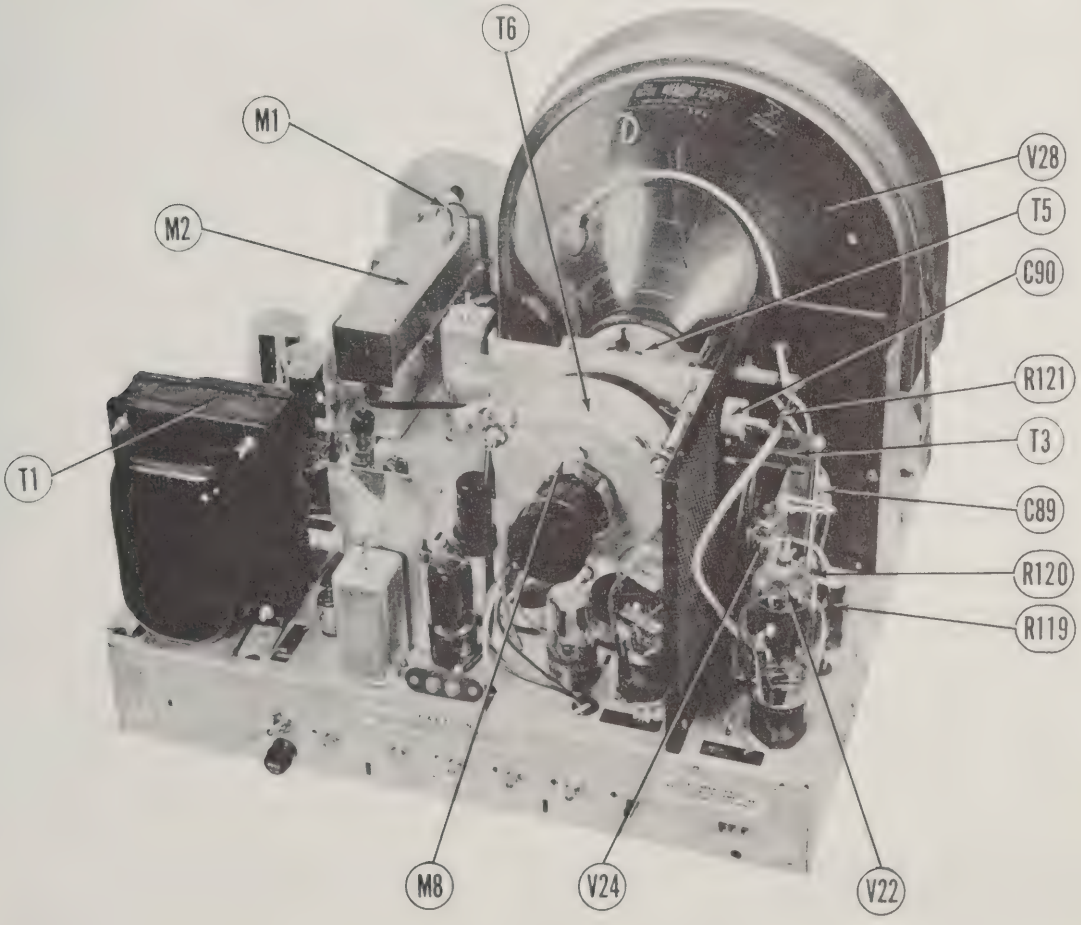
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		NOTES
					CROSLEY PART No.		
M9	Bayonet	6-8	.25	Blue	138437-8		Type #44

MISCELLANEOUS

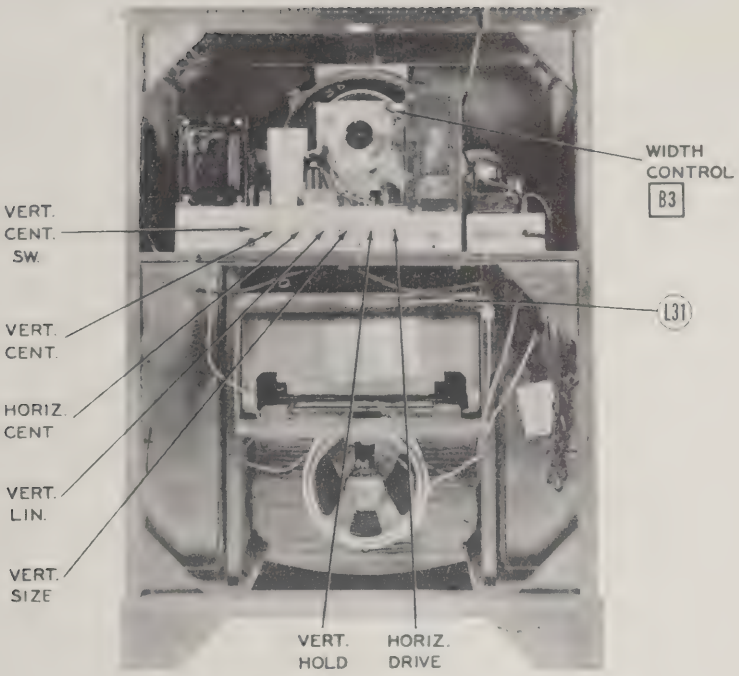
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M10	Switch	B-145623	Radio On-Off, Speaker Change-Over
M11	Tuning Cap.	C-160305	(21-387MMF) (21-387MMF) (34-212MMF) W/T
	Dial Assembly	AB-160489	

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA					REMARKS
	CROSLEY PART No.	ASTATIC PART No.		SHURE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M13		LQD-J	Q and Q-33			



CHASSIS-TOP VIEW



CABINET- REAR VIEW

HORIZONTAL FREQUENCY ADJUSTMENTS

If the picture does not remain in "sync" horizontally turn the horizontal hold adjustment (B1) and determine the two extreme positions where the picture drops into "sync"-not out of synchronization. Set B1 midway between these two positions.

Turn the horizontal centering control until the raster is positioned correctly horizontally. Decrease the contrast control and increase the brightness so the entire raster is visible including the area to the right which usually is blanked out. Adjacent to the right edge of the picture there should be a vertical gray strip about 1/4" wide at the right edge of the raster. Further to the right a darker strip may or may not be present. If this strip is over 3/16" wide or if the first lighter gray strip is not present the phasing is incorrect. If so, turn the phasing control (B2) until the left edge of the darker strip is at the extreme right edge of the raster almost to the disappearing point.

HORIZONTAL LINEARITY AND SIZE ADJUSTMENT

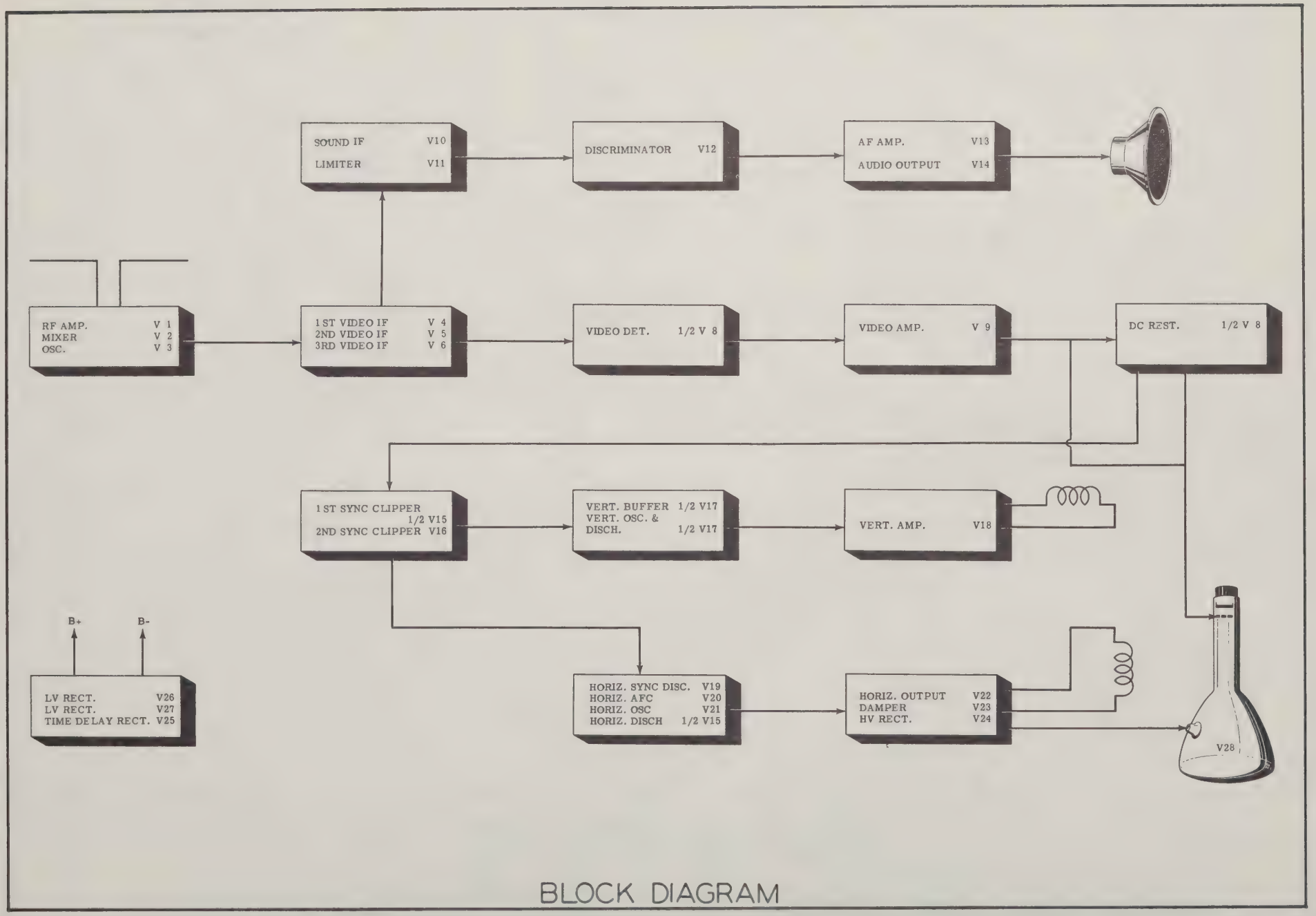
Adjust the horizontal width control (B3) so the picture width is the same as the picture frame opening.

Adjust the horizontal drive control for the best linearity of pattern on the right side of the picture. (This control is pre-set at the factory and normally should not require adjustment in the field.)

The horizontal linearity control (B4) affects the middle portions of the picture. Readjust the horizontal width control (B3) after the horizontal drive and linearity controls have been adjusted, if necessary.

DISASSEMBLY INSTRUCTIONS

1. Remove ten push-on type control knobs.
2. Remove nine screws holding rear cover. Remove phono pick-up plug and open cover on hinges.
3. Disconnect TV audio plug leading to AM chassis.
4. Remove four 7/16" hex head bolts holding TV chassis. Remove chassis.
5. Remove two power plugs from AM chassis.
6. Disconnect speaker plug.
7. Loosen two antenna terminal screws. Remove loop antenna leads.
8. Remove two 7/16" hex head bolts holding AM chassis. Remove chassis.
9. Remove four 1/4" hex nuts holding speaker. Remove speaker.



BLOCK DIAGRAM

EMERSON MODEL 645 (Ch.120115)
(BATTERY OPERATED)

EMERSON MODEL 645

TRADE NAME	Emerson, Model 645 (Ch. 120115)
MANUFACTURER	Emerson Radio & Phonograph Corp., 111 8th Ave., New York 11, New York
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3S4 Power Output
POWER SUPPLY	1.5 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	250MA @ 1.5 Volt DC and 9MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer parallel with base of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (Grid) of 1R5 (V1). Low side to chassis.	455KC (400 ∿ Mod)	Tuning gang fully closed	Across voice coil	A1, A2, A3	Adjust for maximum output.
2.		Loop	540KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1620KC	Tuning gang fully open	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 and 3 until no further improvement can be made.
4.		Loop	1400KC	Tune for max. output	"	A6	Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		EMERSON PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amp.	1U4	1U4	6AR	
V3	DET.-AVC-AF	1U5	1U5	6BW	
V4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	16	100	925066	PRS150/16			UT-161	RF Bypass
C2	.05	200	920060	P288-05			TM-15	AVC Filter
C3	.005	600	920180	P688-005	D6-502	811-005	TM-25	Osc. Anode Bypass
C4	.005	400	920180	P688-005	D6-502	811-005	TM-25	IF Grid Filter
C5	2.2		915005		D2-2.2			Neutralizing
C6A	200		928034	GP200M	D6-201	GP2K-200	1FM-32	Diode RF Filter
B	1000			GP1000M	D6-102	GP2L-001	TM-21	Audio Coupling
C	10000			BPD-10	D6-103	821-01	TM-11	AF Amp. Screen Bypass
D	100			GP100M	D6-101	GP1K-100	1FM-31	AF Amp. Plate Bypass
E	1000			GP1000M	D6-102	GP2L-001	TM-21	Audio Coupling
C7	.005	600	920180	P688-005	D6-502	811-005	TM-25	Output Plate Bypass

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA				INSTALLATION NOTES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	
R1A	1 Meg.	½	390066	Q13-137		B-70-S	Volume control
B	Switch		Not Req.	76-2		Not Req.	Attach to R1A per instructions

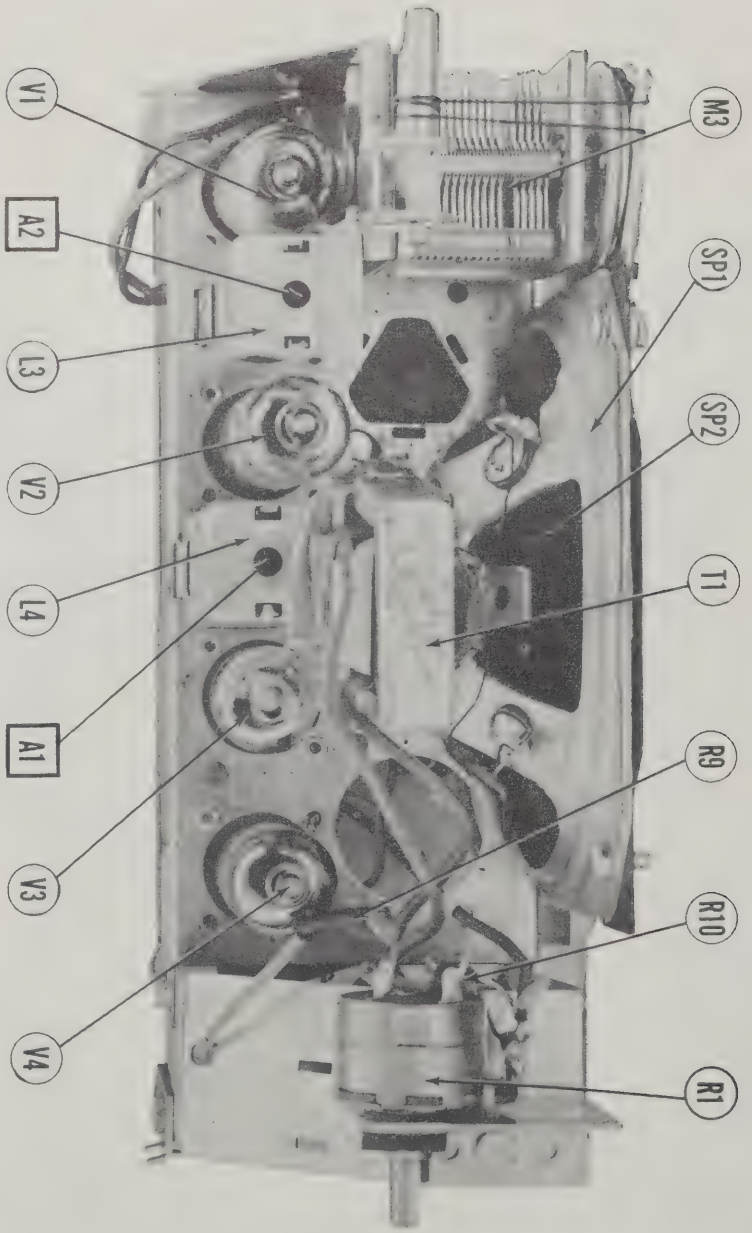
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	EMERSON PART No.	IRC PART No.	
R2	100KΩ	½	350970	BTS-100K	Osc. Grid
R3	15KΩ	½	340770	BTS-15K	Osc. Anode Decoupling
R4	3.3 Meg.	½	351330	BTS-3.3 Meg.	AVC Network
R5	3.3 Meg.	½	351330	BTS-3.3 Meg.	IF Grid
R6	10 Meg.	½	351450	BTS-10 Meg.	AF Amp. Grid
R7	3.3 Meg.	½	351330	BTS-3.3 Meg.	AF Amp. Screen
R8	470KΩ	½	351130	BTS-470K	AF Amp. Plate
R9	3.3 Meg.	½	351330	BTS-3.3 Meg.	Output Grid
R10	820Ω	½	340470	BTS-820	Bias Network

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		EMERSON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	7KΩ	3.4Ω	350Ω	.34Ω	734053	A-3329 †	A-2927 †	RO-13 †	† Bend mounting tabs down and file to fit mounting bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA EMERSON PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.				
SP1	PM	3.4Ω	180068			
	CONE DIA.	V. C. DIA.				
SP2	4 1/8"	9/16"				

R F COILS

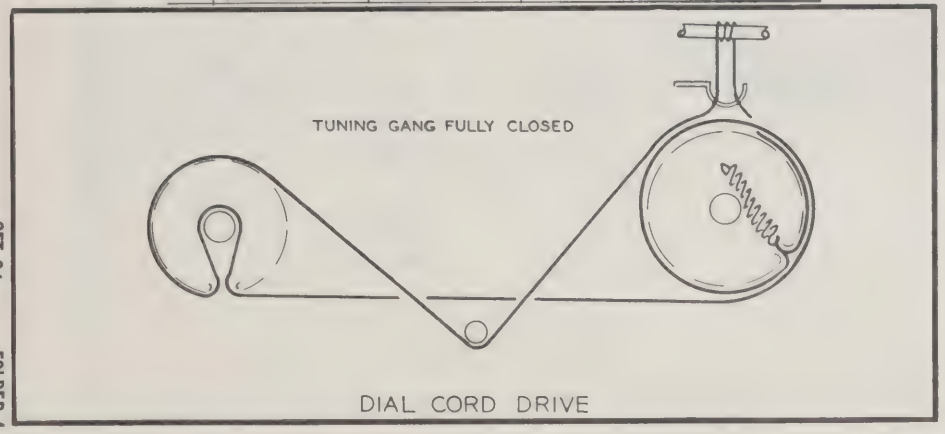
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA EMERSON PART No.	REPLACEMENT DATA MEISSNER PART No.	
L1A	Loop Ant.	3Ω		700044		Used with tuning cap #900057
B	Loop Ant.			700041		Used with tuning cap #900047
L2	Osc. Coil	2.3Ω	9.8Ω	716048A	14-1074	
L3	1st IF	21Ω	21Ω	720062	16-6668	
L4	2nd IF	25Ω	34Ω	720066A	16-6669	

BATTERIES

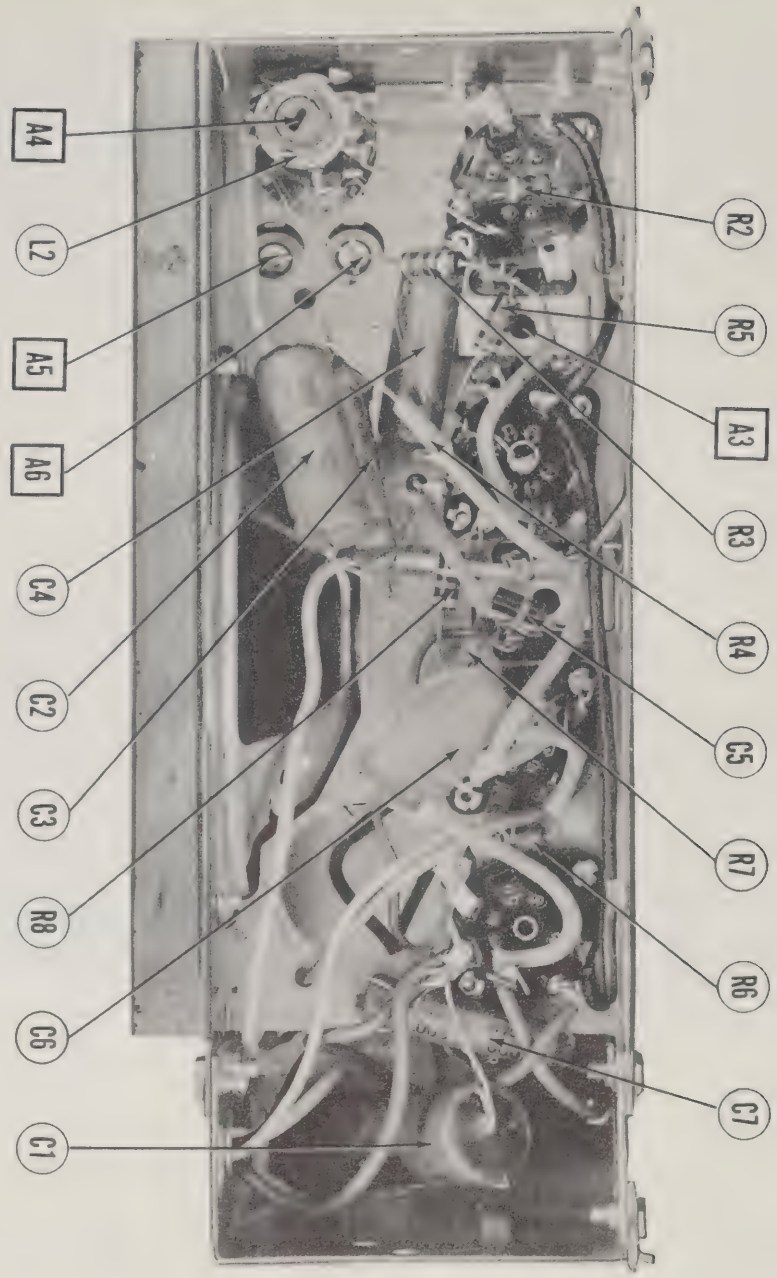
ITEM No.	VOLTAGE	EMERSON PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M1	1.5V "A"		720			2D			
M2	67.5V "B"			467			XX45		

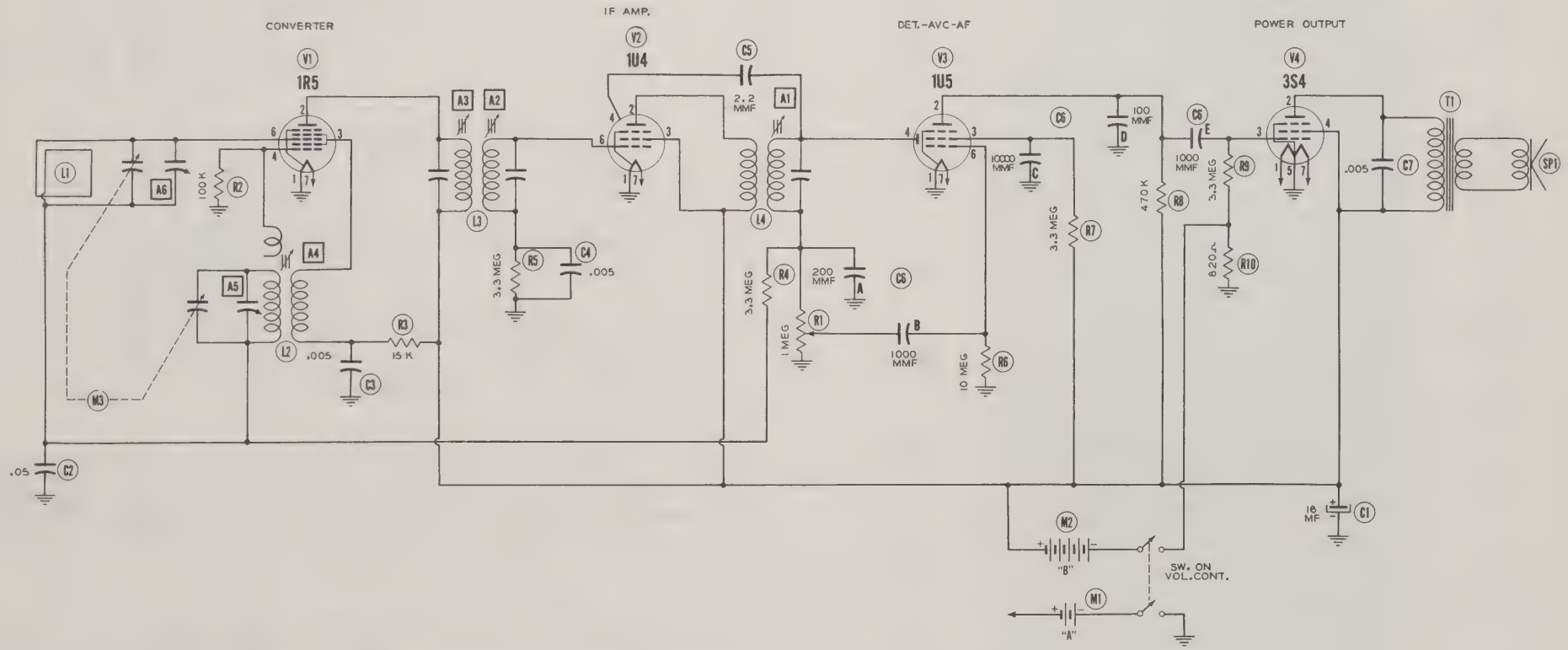
MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M3A	2 Gang Var. Cap.	900057	(14-367MMF, 16-110MMF)
B	2 Gang Var. Cap.	900047	
	Cabinet	140236	
	Knob	460091	
	Dial & Grill	520096	
	Dial Pointer	525043	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	0V.	62VDC	40VDC	§-.3VDC	0V.	-.1VDC	1.5VDC
V 2	1U4	0V.	62VDC	62VDC	0V.	0V.	-.1VDC	1.5VDC
V 3	1U5	0V.	26VDC	11VDC	-.3VDC	0V.	-.1VDC	1.5VDC
V 4	3S4	1.5VDC	60VDC	-.8VDC	62VDC	0V.	60VDC	1.5VDC

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	†21Ω	†15KΩ	100KΩ	*	4.3 Meg.	*
V 2	1U4	*	†25Ω	†0Ω	Inf.	*	3.3 Meg.	*
V 3	1U5	*	†470KΩ	†3.3 Meg.	1 Meg.	27Ω	10 Meg.	*
V 4	3S4	*	†350Ω	3.3 Meg.	†0Ω	*	†350Ω	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.
† MEASURED FROM PIN 4 OF V4.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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94-4

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder

NATIONAL MODELS NC-TV-10C, T, W, NC-TV-12C, W, NC-TV-1001, NC-TV-1025, NC-TV-1201, NC-TV-1202, NC-TV-1225, NC-TV-1226

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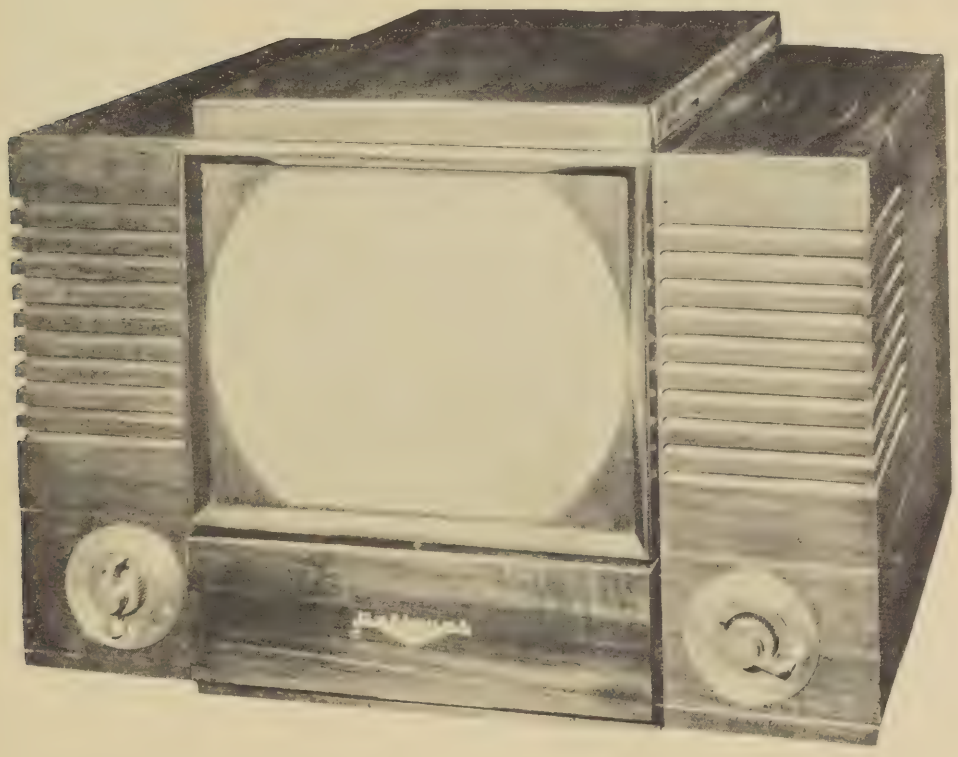

MODEL NC-TV-10T

NATIONAL MODELS NC-TV-10C, T, W, NC-TV-12C, W, NC-TV-1001, NC-TV-1025, NC-TV-1201, NC-TV-1202, NC-TV-1225, NC-TV-1226

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PHOTOFACT* Folder

NATIONAL MODELS NC-TV-10C, T, W, NC-TV-12C, W, NC-TV-1001, NC-TV-1025, NC-TV-1201, NC-TV-1202, NC-TV-1225, NC-TV-1226

NATIONAL MODEL NC-TV-10T

TRADE NAME	National, Models NC-TV-10C, NC-TV-10T, NC-TV-10W, NC-TV-12C, NC-TV-12W, NC-TV-1001, NC-TV-1025, NC-TV-1201, NC-TV-1202, NC-TV-1225, NC-TV-1226
MANUFACTURER	National Co. Inc., Malden, Mass.
TYPE SET	Television Receiver
TUBES	Twenty Two
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13

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NATIONAL MODELS NC-TV-10C, T, W, NC-TV-12C, W, NC-TV-1001, NC-TV-1025, NC-TV-1201, NC-TV-1202, NC-TV-1225, NC-TV-1226

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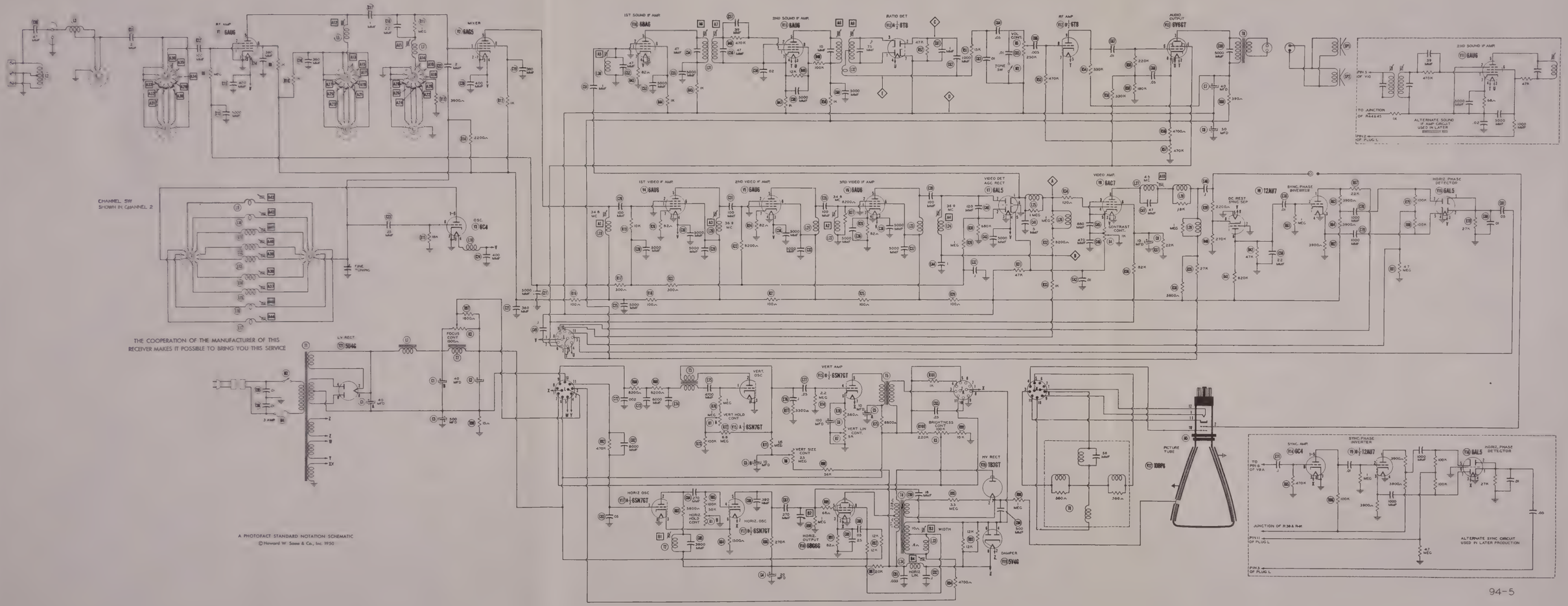

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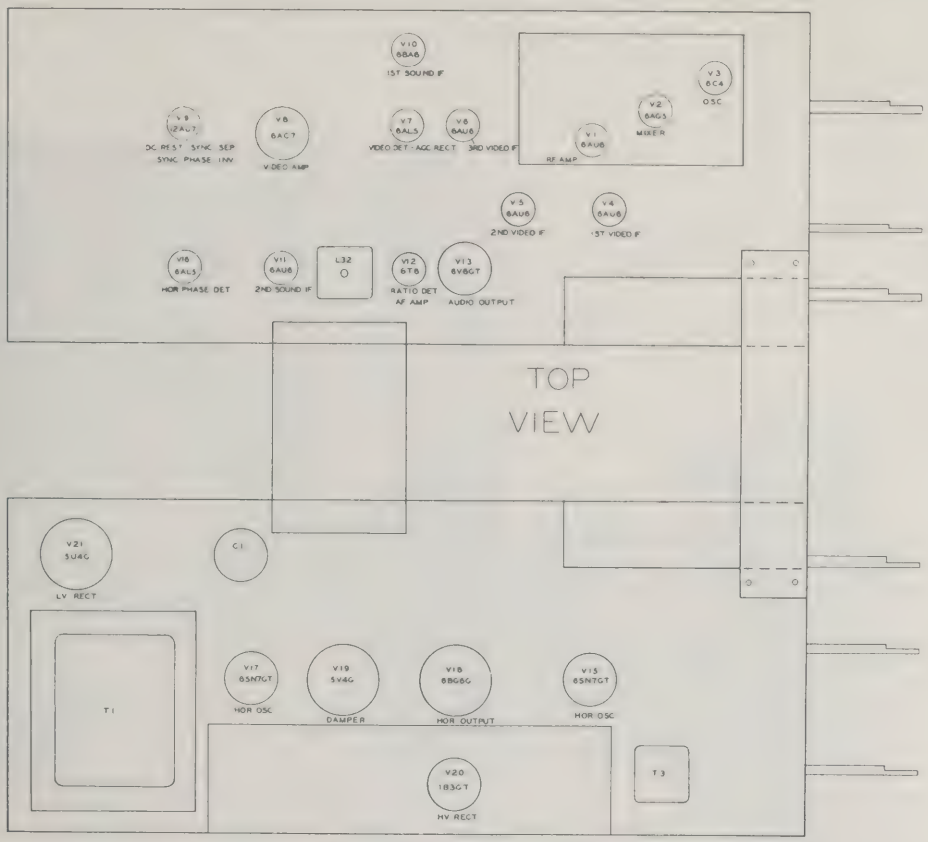
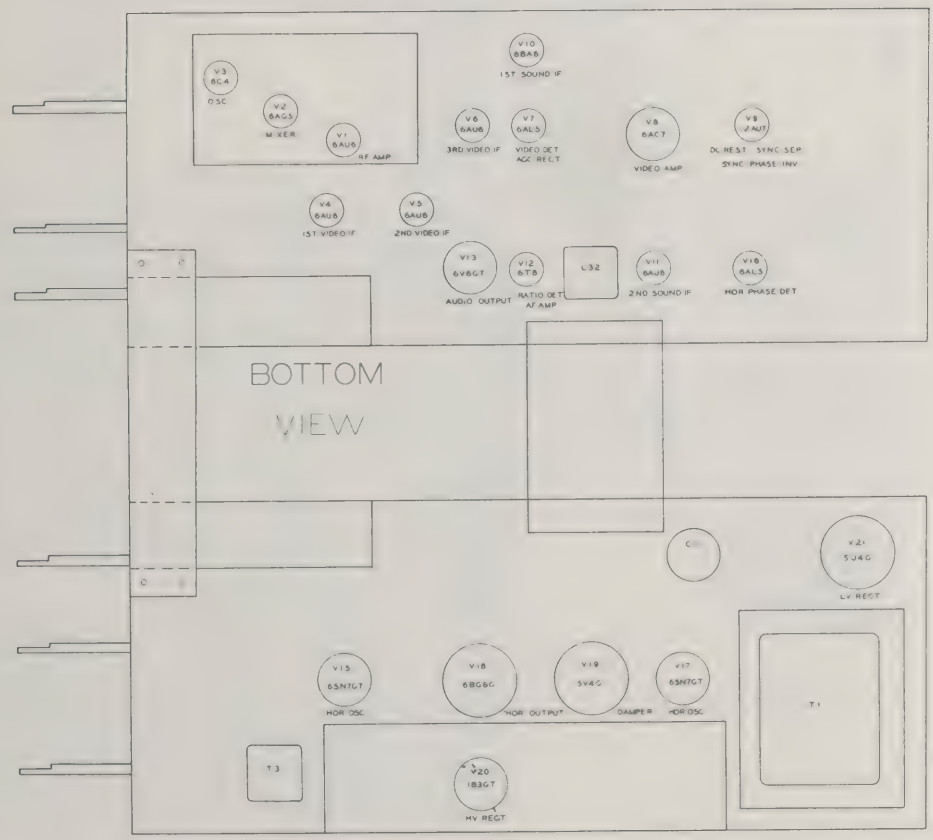




TUBE PLACEMENT CHART

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

CHASSIS TOP VIEW

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

It is recommended that the horizontal oscillator tube (V17) be removed during alignment to remove high voltage shock hazard.

VIDEO IF ALIGNMENT

Remove the local oscillator tube (V3).
Connect the negative lead of a 2 volt battery to the junction of C28 and R17. Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	34.8MC (Unmod.)	Any	DC Probe to Point A Common to Point B	A1, A2	Adjust for maximum deflection.
2.		"	36.9MC	"	"	A3, A4	Adjust for maximum deflection. Repeat steps 1 and 2.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
3.		High side to ungrounded tube shield floating over mixer tube (V2). Low side to chassis.	35MC (10MC SWP)	34.8MC 36.9MC	Any	Vert. Amp. to Point A Low side to chassis.		Check for response as shown in Fig 1 with markers as shown. If necessary retouch A1 thru A4 for proper response.

SOUND IF ALIGNMENT

Remove 2 volt battery.
Turn contrast control fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.01MFD	High side to pin 7 (cathode) of 6AL5 (V6). Low side to chassis.	4.5MC (Unmod.)	Any	DC Probe to Point C Common to Point D	A5, A6, A7, A8	Adjust for maximum deflection. Adjust output of signal generator to give 4 volt reading. Leave generator at this setting until completion of step 4.
4.	.01MFD	"	"	"	DC Probe to Point C Common to Point E	A9	Adjust A9 for 2 volt reading. Repeat steps 3 and 4.
5.	.01MFD	"	"	"	DC Probe to Point C Common to Point D	A10	Remove tube V10. Connect a .005MFD capacitor from picture tube grid connection plug, to pin 5 of V10 socket. Adjust A10 for MINIMUM response.

RF AND MIXER ALIGNMENT (9 CHANNEL TUNER)

a) Disconnect the blue lead from the mixer and connect it thru a 4700 ohm resistor to the junction of R18 and C25.
b) Connect the vertical amplifier of oscilloscope to the plate end of the 4700 ohm resistor, if scope does not have an isolating capacitor in the input connect a .1MFD capacitor in series with the vertical amplifier lead. Connect the low side to chassis.
c) Connect a short circuit across the channel 6 section of L3.
d) This section is the one on the rear shield, and has a tuning slug.
e) The high channels can be aligned for all the odd numbered channels, or all the even numbered channels, but they cannot be intermixed. When aligning for channels 9, 11 and 13 ignore the steps for channels 8, 10 and 12. When aligning for channels 8, 10 and 12, ignore the step for channels 9, 11 and 13.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to left hand "A" terminal on antenna terminal strip. Low side to "G" terminal.	213MC (12MC SWP)	211.25MC 215.75MC	13	See instructions above	A11, A12	Adjust for response curve as per Fig 2 with markers as shown.
7.	Direct	"	207MC (12MC SWP)	205.25MC 209.75MC	12	"	A11, A12	"
8.	Direct	"	201MC (12MC SWP)	199.25MC 203.75MC	11	"	A13, A14	Adjust for response as per Fig 3, with markers as shown.
9.	Direct	"	195MC (12MC SWP)	193.25MC 197.75MC	10	"	A13, A14	"
10.	Direct	"	189MC (12MC SWP)	187.25MC 191.75MC	9	"	A15, A16	Expand or compress coil turns for response as per Fig 4 with markers as shown.
11.	Direct	"	183MC (12MC SWP)	181.25MC 185.75MC	8	"	A15, A16	Expand or compress coil turns for response as per Fig 5.
12.	Direct	"	177MC (12MC SWP)	175.25MC 179.75MC	7	"	A17, A18	Expand or compress coil turns for response as per Fig 6.
13.	Direct	"	85MC (10MC SWP)	83.25MC 87.75MC	6	"	A19, A20	Expand or compress coil turns and adjust coupling for response as per Fig 5.
14.	Direct	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"	A21, A22	"
15.	Direct	"	69MC (10MC SWP)	67.25MC 71.75MC	4	"	A23, A24	"
16.	Direct	"	63MC (10MC SWP)	61.25MC 65.75MC	3	"	A25, A26	"
17.	Direct	"	57MC (10MC SWP)	55.25MC 59.75MC	2	"	A27, A28	"

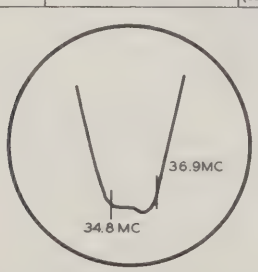


FIG.1

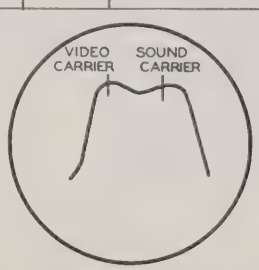


FIG.2

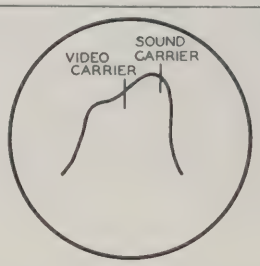


FIG.3

ALIGNMENT INSTRUCTIONS (CONT.)

RF AMP. GRID CIRCUIT ALIGNMENT (9 CHANNEL TUNER)

Remove the short across the channel 6 section of L3.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
18.	Direct	High side to left hand "A" terminal on antenna terminal strip. Low side to "G" terminal.	85MC (10MC SWP)	83.25MC 87.75MC	6	See instructions above RF and Mixer Alignment	A29	Adjust for response as per Fig 5.
19.	Direct	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"	A30	Expand or compress coil turns for response as per Fig 5.
20.	Direct	"	69MC (10MC SWP)	67.25MC 71.75MC	4	"	A31	"
21.	Direct	"	63MC (10MC SWP)	61.25MC 65.75MC	3	"	A32	"
22.	Direct	"	57MC (10MC SWP)	55.25MC 59.75MC	2	"	A33	"
23.	Direct	"	177MC (12MC SWP)	175.25MC 179.75MC	7	"	A34	Expand or compress coil turns for response as per Fig 6.
24.	Direct	"	183MC (12MC SWP)	181.25MC 185.75MC	8	"	A35	Expand or compress coil turns for response as per Fig 5.
25.	Direct	"	189MC (12MC SWP)	187.25MC 191.75MC	9	"	A35	Expand or compress coil turn for response as per Fig 4.
26.	Direct	"	195MC (12MC SWP)	193.25MC 197.75MC	10	"	A36	Expand or compress coil turn for response as per Fig 3.
27.	Direct	"	201MC (12MC SWP)	199.25MC 203.75MC	11	"	A36	"

OSCILLATOR ALIGNMENT (9 CHANNEL TUNER)

Replace the local oscillator tube V3.
Set fine tuning control to mid-position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
28.	Direct	High side to left hand "A" terminal of antenna terminal strip. Low side to "G" terminal.	92.55MC (Unmod.)	2	See instructions above RF and Mixer Alignment.	A37	Adjust for minimum response on oscilloscope. This will be indicated by a finely defined line between two wide lines.
29.	Direct	"	98.55MC (Unmod.)	3	"	A38	"
30.	Direct	"	104.55MC (Unmod.)	4	"	A39	"
31.	Direct	"	114.55MC (Unmod.)	5	"	A40	"
32.	Direct	"	120.55MC (Unmod.)	6	"	A41	"
33.	Direct	"	141.25MC (Unmod.)	7	"	A42	"
34.	Direct	"	147.25MC (Unmod.) 153.25MC (Unmod.)	8 or 9	"	A43	"
35.	Direct	"	159.25MC (Unmod.) 165.25MC (Unmod.)	10 or 11	"	A44	"
36.	Direct	"	171.25MC (Unmod.) 177.25MC (Unmod.)	12 or 13	"	A45	"

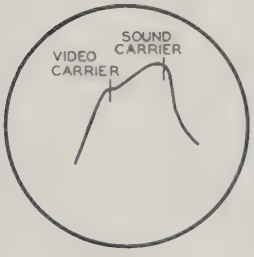


FIG. 4

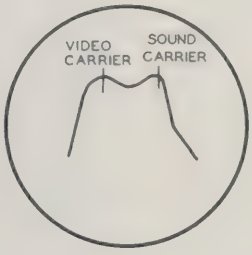


FIG. 5

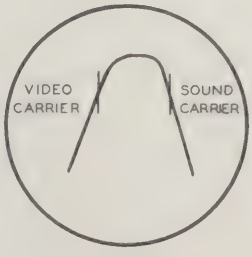


FIG. 6

RF AND MIXER ALIGNMENT (12 CHANNEL TUNER)

See steps A thru D of 9 channel tuner alignment.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
37.	Direct	High side to left hand "A" terminal on antenna terminal strip. Low side to "G" terminal.	213MC (10MC SWP)	211.25MC 215.75MC	13	See instructions above	A46, A47	Adjust for response curve similar to Fig 2.
38.	Direct	"	207MC (10MC SWP)	205.25MC 209.75MC	12	"	A48, A49	Expand or compress coil turns for response similar to Fig 2.
39.	Direct	"	201MC (10MC SWP)	199.25MC 203.75MC	11	"	A50, A51	Expand or compress coil turns for response similar to Fig 3.
40.	Direct	"	195MC (10MC SWP)	193.25MC 197.75MC	10	"	A52, A53	"
41.	Direct	"	189MC (10MC SWP)	187.25MC 191.75MC	9	"	A54, A55	Expand or compress coil turns for response similar to Fig 4.
42.	Direct	"	183MC (10MC SWP)	181.25MC 185.75MC	8	"	A56, A57	Expand or compress coil turns for response curve similar to Fig 5.
43.	Direct	"	177MC (10MC SWP)	175.25MC 179.75MC	7	"	A58, A59	Expand or compress coil turns for response curve similar to Fig 6.
44.	Direct	"	85MC (10MC SWP)	83.25MC 87.75MC	6	"	A60, A61	Expand or compress coil turns for response curve similar to Fig 5.
45.	Direct	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"	A62, A63	"
46.	Direct	"	69MC (10MC SWP)	67.25MC 71.75MC	4	"	A64, A65	"
47.	Direct	"	63MC (10MC SWP)	61.25MC 65.75MC	3	"	A66, A67	"
48.	Direct	"	57MC (10MC SWP)	55.25MC 59.75MC	2	"	A68, A69	

RF AMP. GRID CIRCUIT ALIGNMENT (12 CHANNEL TUNER)

Remove the short across the channel 6 portion of L3.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
49.	Direct	High side to left hand "A" terminal on antenna terminal strip. Low side to "G" terminal.	85MC (10MC SWP)	83.25MC 87.75MC	6	See instructions above RF and Mixer Alignment.	A70	Adjust for response curve similar to Fig 5.
50.	Direct	"	79MC (10MC SWP)	77.25MC 81.75MC	5	"	A71	Expand or compress coil turns for response curve similar to Fig 5.
51.	Direct	"	69MC (10MC SWP)	67.25MC 71.75MC	4	"	A72	"
52.	Direct	"	63MC (10MC SWP)	61.25MC 65.75MC	3	"	A73	"
53.	Direct	"	57MC (10MC SWP)	55.25MC 59.75MC	2	"	A74	"
54.	Direct	"	177MC (10MC SWP)	175.25MC 179.75MC	7	"	A75	Expand or compress coil turns for response curve similar to Fig 6.
55.	Direct	"	183MC (10MC SWP)	181.25MC 185.75MC	8	"	A76	Expand or compress coil turns for response curve similar to Fig 5.
56.	Direct	"	189MC (10MC SWP)	187.25MC 191.75MC	9	"	A77	Expand or compress coil turns for response curve similar to Fig 4.
57.	Direct	"	195MC (10MC SWP)	193.25MC 197.75MC	10	"	A78	Expand or compress coil turns for response curve similar to Fig 3.

OSCILLATOR ALIGNMENT (12 CHANNEL TUNER)

Replace the local oscillator tube (V3).
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
58.	Direct	High side to left hand "A" terminal on antenna terminal strip. Low side to "G" terminal.	92.55MC (Unmod.)	2	See instructions above RF and Mixer Alignment.	A79	Adjust for minimum response on oscilloscope. This will be indicated by a finely defined line between two wide lines.
59.	Direct	"	98.55MC (Unmod.)	3	"	A80	"
60.	Direct	"	104.55MC (Unmod.)	4	"	A81	"
61.	Direct	"	114.55MC (Unmod.)	5	"	A82	"
62.	Direct	"	120.55MC (Unmod.)	6	"	A83	"
63.	Direct	"	141.25MC (Unmod.)	7	"	A84	"
64.	Direct	"	147.25MC (Unmod.)	8	"	A85	"
65.	Direct	"	153.25MC (Unmod.)	9	"	A86	"
66.	Direct	"	159.25MC (Unmod.)	10	"	A87	"
67.	Direct	"	165.25MC (Unmod.)	11	"	A88	"
68.	Direct	"	171.25MC (Unmod.)	12	"	A89	"
69.	Direct	"	177.25MC (Unmod.)	13	"	A90	"

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	-.5VDC	0V.	0V.	6.3VAC	112VDC	112VDC	0V.		
V 2	6AG5	-.7VDC	0V.	0V.	6.3VAC	115VDC	115VDC	0V.		
V 3	6C4	87VDC	0V.	0V.	6.3VAC	87VDC	§-1VDC	0V.		
V 4	6AU6	-.2VDC	0V.	0V.	6.3VAC	120VDC	120VDC	.4VDC		
V 5	6AU6	-.2VDC	0V.	6.3VAC	0V.	120VDC	120VDC	.5VDC		
V 6	6AU6	0V.	0V.	6.3VAC	0V.	125VDC	125VDC	.7VDC		
V 7	6AL5	-2.3VDC	-.2VDC	0V.	6.3VAC	0V.	0V.	-2.5VDC		
V 8	6AC7	0V.	6.3VAC	1.2VDC	-2.3VDC	1.2VDC	180VDC	0V.	167VDC	
V 9	12AU7	117VDC	0V.	5.8VDC	0V.	0V.	5.5VDC	0V.	1.1VDC	6.3VAC
V 10	6BA6	0V.	0V.	0V.	6.3VAC	118VDC	125VDC	1.2VDC		
V 11	6AU6	†.6VDC	†2.4VDC	†0V.	†6.3VAC	†250VDC	†28VDC	2.4VDC		
V 12	6T8	†-.4VDC	†-.7VDC	†-.4VDC	†0V.	†6.3VDC	†-.4VDC	†0V.	†-.4VDC	†92VDC
V 13	6V6GT	0V.	†6.3VAC	†220VDC	†225VDC	†-6.5VDC	0V.	†0V.	†0V.	
V 14	6C4	NOT USED IN ALL MODELS								
V 15	6SN7GT	-5.6VDC	107VDC	0V.	0V.	310VDC	4.5VDC 17VDC	6.3VAC	0V.	
V 16	6AL5	0V.	0V.	6.3VAC	0V.	1.3VDC	0V.	-1 VDC		
V 17	6SN7GT	.1VDC	260VDC	9VDC	-3VDC	100VDC	9VDC	6.3VAC	0V.	
V 18	6BG6G	Inf.	6.3VAC	8.8VDC	270VDC	.2VDC	0V.	0V.	270VDC	TOP CAP *
V 19	5V4G	285VDC	410VDC	0V.	350VDC	0V.	350VDC	0V.	410VDC	
V 20	1B3GT	* DO NOT MEASURE.								
V 21	5U4G	0V.	390VDC	0V.	385VAC	0V.	385VAC	0V.	390VDC	
V 22	10BP4	0V.	1 VDC	PIN 10 345VDC	PIN 11 110VDC	PIN 12 6.3VAC				

§ TAKEN WITH VACUUM TUBE VOLTMETER.
† MEASURED FROM PIN 8 OF V13.
* DO NOT MEASURE.

RESISTANCE READINGS

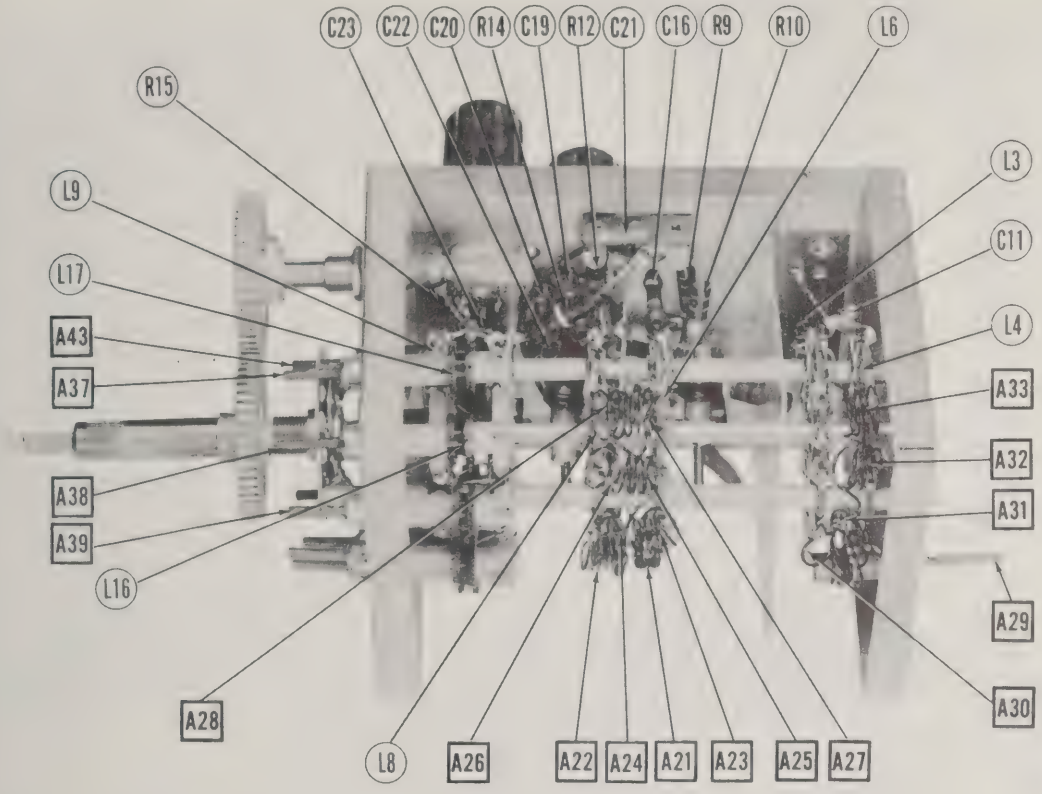
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AU6	2.5 Meg.	0Ω	0Ω	.1Ω	†1.5KΩ	†1.5KΩ	0Ω		
V 2	6AG5	1 Meg.	0Ω	0Ω	.1Ω	†530Ω	†1.5KΩ	0Ω		
V 3	6C4	†3KΩ	Inf.	0Ω	.1Ω	†3KΩ	†18KΩ	0Ω		
V 4	6AU6	1.7 Meg.	0Ω	0Ω	.1Ω	†300Ω	†300Ω	82Ω		
V 5	6AU6	1.7 Meg.	0Ω	.1Ω	0Ω	†200Ω	†200Ω	82Ω		
V 6	6AU6	.1Ω	0Ω	.1Ω	0Ω	†100Ω	†100Ω	82Ω		
V 7	6AL5	9KΩ	700KΩ	0Ω	.1Ω	.5Ω	0Ω	1000Ω		
V 8	6AC7	0Ω	.1Ω	1000Ω	10KΩ	1000Ω	♦15KΩ	0Ω	†5.5KΩ	
V 9	12AU7	†8KΩ	1 Meg.	4KΩ	0Ω	0Ω	47KΩ	0Ω	270KΩ	.1Ω
V 10	6BA6	1.5Ω	0Ω	0Ω	.1Ω	†1000Ω	†1000Ω	82Ω		
V 11	6AU6	†470KΩ	†1000Ω	†0Ω	†1Ω	♦1000Ω	†1MΩ	†1000Ω		
V 12	6T8	Inf.	†47KΩ	Inf.	†0Ω	†1Ω	Inf.	†0Ω	†475KΩ	♦330KΩ
V 13	6V6GT	Inf.	†1Ω	♦650Ω	♦275Ω	♦400KΩ	Inf.	†0Ω	♦20KΩ	
V 14	6C4	NOT USED IN ALL MODELS.								
V 15	6SN7GT	1.2 Meg.	♦2.8 Meg. ♦1.4 Meg.	0Ω	2.2 Meg.	♦8KΩ	5.5KΩ 560Ω	.1Ω	0Ω	
V 16	6AL5	27KΩ	27KΩ	.1Ω	0Ω	5 Meg.	Inf.	5 Meg.		
V 17	6SN7GT	5.2 Meg.	¶22KΩ	1.5KΩ	100KΩ	♦300KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6BG6G	Inf.	.1Ω	82Ω	♦11KΩ	1 Meg.	0Ω	0Ω	♦11KΩ	TOP CAP ¶200Ω
V 19	5V4G	♦27KΩ	♦6.5KΩ	Inf.	♦270Ω	Inf.	♦270Ω	Inf.	♦6.5KΩ	
V 20	1B3GT	Inf.	Inf.	Inf .	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ¶550Ω
V 21	5U4G	Inf.	20KΩ	Inf.	760Ω	Inf.	740Ω	InfΩ	20KΩ	
V 22	10BP4	0Ω	300KΩ	PIN 10 ♦1000Ω	PIN 11 100KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V13.
♦ MEASURED FROM PIN 8 OF V21.
¶ MEASURED FROM PIN 8 OF V19.

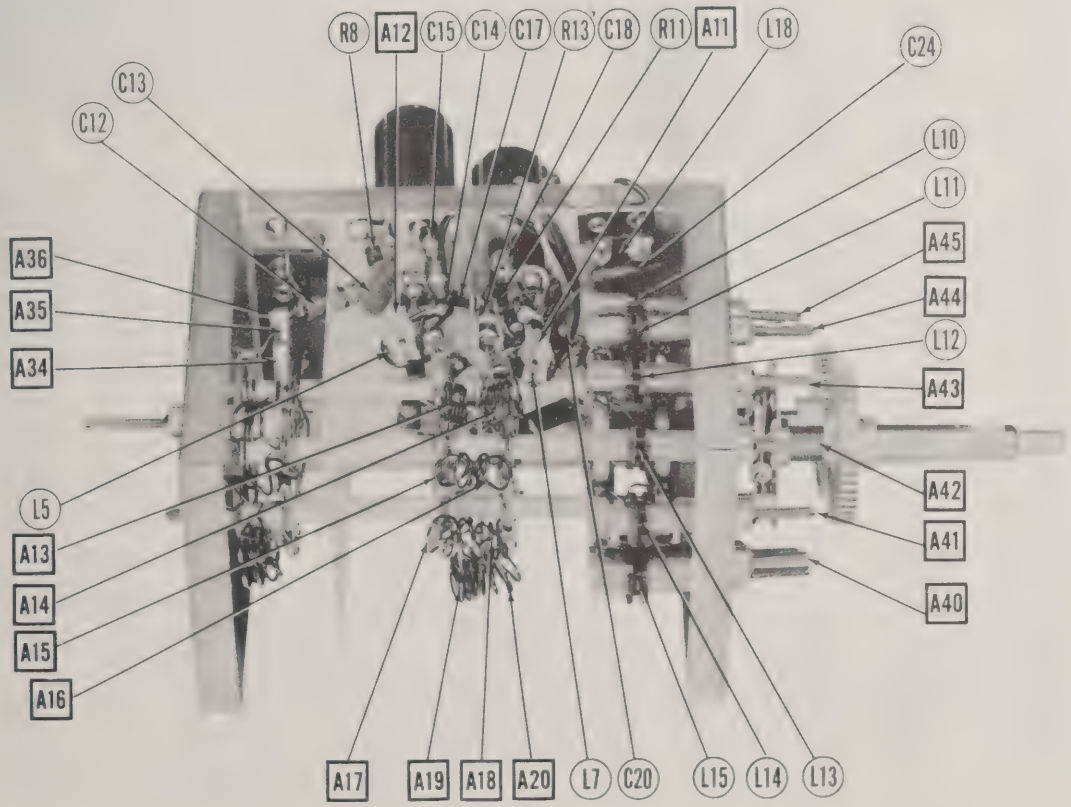
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.

CHASSIS BOTTOM VIEW–CAPACITOR IDENTIFICATION

CHASSIS BOTTOM VIEW–RESISTOR IDENTIFICATION



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AU6	6AU6	7BK	
V2	Mixer	6AG5	6AG5	7BD	
V3	Oscillator	6C4	6C4	6BG	
V4	1st Video IF	6AU6	6AU6	7BK	
V5	2nd Video IF	6AU6	6AU6	7BK	
V6	3rd Video IF	6AU6	6AU6	7BK	
V7	Video Det.-AGC Rect.	6AL5	6AL5	6BT	
V8	Video Amp.	6AC7	6AC7	8N	
V9	DC Rest.-Sync. Sep.-Sync. Phase Inv.	12AU7	12AU7	9A	
V10	1st Sound IF	6BA6	6BA6	7BK	
V11	2nd Sound IF	6AU6	6AU6	7BK	
V12	Ratio Det. AF Amp.	6T8	6T8	9E	
V13	Audio Output	6V6GT	6V6GT	7AC	
V14	Sync. Amp	6C4	6C4	6BG	Used only on sets with serial No. of 2610000 or larger.
V15	Vert. Osc. Vert. Amp	6SN7GT	6SN7GT	8BD	
V16	Hor. Phase Det.	6AL5	6AL5	6BT	
V17	Hor. Osc.	6SN7GT	6SN7GT	8BD	
V18	Hor. Output	6BG6G	6BG6G	5BT	
V19	Damper	5V4G	5V4G	5L	
V20	HV Rectifier	1B3GT	1B3GT	3C	
V21	LV Rectifier	5U4G	5U4G	5T	
V22A	Picture Tube	10BP4	10BP4	12D	
B	Picture Tube	12LP4	12LP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	K495-1	AF88J			TVL-64	■ Filter
B	40	450						▲ Filter
C2	40	450	E338-17	PRS450/40			TVA-24	Filter
C3	500	12	E338-6	PRS12/500			TVA-4	Bias Filter
C4	20	450	E338-16	PRS450/20			TVA-22	Decoupling
C5A	10	450	L189-1	PRSA450/10-10			TVA-25	Vert. Output Decoupling
B	10	450						Decoupling
C6	100	25	E338-15	PRS25/100			TVA-8	Vert. Output Cath. Bypass
C7	40	450	E338-17	PRS450/40			TVA-24	Decoupling
C8	50	300	E338-17	PRS450/40			TVA-24	Filter *
C9	10	200	E338-19	PRS250/12			UT-122	V. Amp. Screen Bypass
C10	47		J695-1	GP47M	D6-470	GP1K-47		RF Coupling
C11	21		D825D-410	GP22M	D6-220	GP1K-22		RF Coupling
C12	100		F913-2	GP100M	D6-101	GP1K-100		RF Coupling
C13	5000		K946-1	BPD-5	D6-502	81I-005		AGC Filter
C14	360		K941-1	GP360M	D6-391	GP2K-390		RF Screen Bypass
C15	430		K941-2	GP390M	D6-401	GP2K-390		RF Filament Bypass
C16	360		K941-1	GP360M	D6-391	GP2K-390		RF Plate Decoupling
C17	1		L381-4		D2-1			RF Coupling
C18	22		F912-10	GP22K	D6-220	GP1K-22		RF Coupling
C19	360		K941-1	GP360M	D6-391	GP2K-390		Mixer Screen Bypass
C20	400		K941-2	GP390M	D6-401	GP2K-390		Mixer Filament Bypass
C21	360		K941-1	GP360M	D6-391	GP2K-390		Decoupling
C22	2		F912-3					Osc. Coupling
C23	25		F912-11	GP25K	D6-250	GP1K-25		Osc. Grid Cap.
C24	400		K941-2	GP390M	D6-401	GP2K-390		Osc. Filament Bypass
C25	5000		K946-1	BPD-5	D6-502	81I-005		Decoupling
C26	100		D825D-421	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C27	5000		K946-1	BPD-5	D6-502	81I-005	29C1	AGC Filter
C28	5000		K946-1	BPD-5	D6-502	81I-005	29C1	AGC Filter
C29	5000		K946-1	BPD-5	D6-502	81I-005	29C1	1st V. IF Decoupling
C30	5000		K946-1	BPD-5	D6-502	81I-005	29C1	1st V. IF Filament Bypass
C31	100		D825D-421	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C32	.1	400	D827-11	P488-1			TM-1	AGC Filter
C33	5000		K946-1	BPD-5	D6-502	81I-005	29C1	2nd V. IF Decoupling
C34	5000		K946-1	BPD-5	D6-502	81I-005	29C1	2nd V. IF Filament Bypass
C35	100		D825D-421	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C36	5000		K946-1	BPD-5	D6-502	81I-005	29C1	3rd V. IF Cathode Bypass
C37	5000		K946-1	BPD-5	D6-502	81I-005	29C1	3rd V. IF Decoupling
C38	5000		K946-1	BPD-5	D6-502	81I-005	29C1	3rd V. IF Filament Bypass
C39	100		D825D-421	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C40	120	500	J665-35	1468-00015	D6-121	GP2K-120	1FM-315	IF Coupling
C41	30		D825D-401	GP5K	D2-47	NP0K-5	MS-55	V. Diode Filter
C42	.01	600	D827-7	P688-01	D6-103	GP2-335-01	TM-11	AGC Filter
C43	5000		K946-1	BPD-5	D6-502	81I-005	29C1	V.-AGC Det. Filament Bypass
C44	.1	400	D827-11	P488-1			TM-1	Bias Filter
C45	680	500	J665-63		D6-681	GP2K-680	MS-37	V. Amp. Cathode Bypass
C46	470	500	J665-56	1468-0065	D6-471	GP2K-470	1FM-35	V. Amp. Cathode Bypass
C47	47		D825D-428	CN47JN750	DN-47	N750L-47	MS-45	Fixed Trimmer
C48	.1	400	D827-11	P488-1			TM-1	Video Coupling
C49	.1	400	D827-11	P488-1			TM-1	Pic. Tube Cathode Decoupling
C50	22		K940-3	GP22K	D6-220	GP1K-22	MS-425	DC Res. Cathode Bypass
C51	1		L081-4		D2-1			S. IF Coupling
C52	47		D825D-428	CN47JN750	DN-47	N750L-47	MS-45	Fixed Trimmer
C53	5000		K946-1	BPD-5	D6-502	81I-005	29C1	1st S. IF Screen Bypass
C54	47		D825D-428	CN47JN750	DN-47	N750L-47	MS-45	Fixed Trimmer
C55	5000		K946-1	BPD-5	D6-502	81I-005	29C1	1st S. IF Plate Decoupling
C56	47		D825D-428	CN47JN750	DN-47	N750L-47	MS-45	Fixed Trimmer
C57	39	500	J665-17	1468-00004	D6-390	GP1K-39	1FM-44	S. IF Coupling
C58	.02	400	D827-43	P488-02			TM-12	2nd S. IF Cathode Bypass
C59	5000		K946-1	BPD-5	D6-502	81I-005	29C1	2nd S. IF Screen Bypass

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C60	5000		K946-1	BPD-5	D6-502	81I-005	29C1	2nd S. IF Decoupling
C61	1.0	200	D827-41	484-1.0			TC-10	Stabilizing Cap.
C62	1000	500	J665-71	1468-001	D6-102	GP2L-001	1FM-21	Diode Load Cap.
C63	.01	400	D827-7	P488-01	D6-103	GP2-335-01	TM-11	De-emphasis
C64	.05	600	D827-3	P688-05			TM-15	Audio Coupling
C65	.01	600	D827-7	P688-01	D6-103	GP2-335-01	TM-11	Tone Compensation
C66	.005	600	D827-27	P688-005	D6-502	GP2M-005	TM-25	Audio Coupling
C67	.01	600	D827-7	P688-01	D6-103	GP2-335-01	TM-11	Audio Coupling
C68	.05	600	D827-3	P688-05			TM-15	Bias Filter
C69	5000	500	K946-1	1467-005	D6-502	GP2M-005	29C1	Output Plate Bypass
C70	.01	600	D827-7	P688-01	D6-103	GP2-335-01	TM-11	Sync. Coupling
C71	.1	400	D827-11	P488-1			TM-1	Sync. Coupling †
C72	.002	600	D827-8	P688-002	D6-202	GP2M-002	TM-22	Integrator Net.
C73	6000	500	D827-27	1467-006	D6-562	GP2M-0056	1FM-26	Integrator Net. †
C74	6000	500	D827-27	1467-006	D6-562	GP2M-0056	1FM-26	Integrator Net. †
C75	4700	500	J666-40	1467-005	D6-472	GP2M-0047	1FM-25	Vert. Osc. Grid Cap.
C76	.1	400	D827-11	P488-1			TM-1	Vert. Discharge
C77	.25	400	D827-17	P488-25			TC-2	Vert. Sweep Coupling
C78	1000	500	J665-71	1468-001	D6-102	GP2L-001	1FM-21	Hor. Sync. Coupling
C79	1000	500	J665-71	1468-001	D6-102	GP2L-001	1FM-21	Hor. Sync. Coupling
C80	.01	600	D827-7	P688-01	D6-103	GP2-335-01	TM-11	Integrator Net.
C81	.05	600	D827-3	P688-05			TM-15	AFC Feedback
C82	6000	500	D827-27	1467-006	D6-562	GP2M-0056	1FM-26	AFC Filter †
C83	.05	600	D827-3	P688-05			TM-15	Hor. Osc. Grid Cap.
C84	270	500	J665-47	GP270K	D6-271	GP2K-270		Hor. Feedback
C85	3900	500	J819-3					Fixed Trimmer
C86	390	500	J665-53	1468-0004	D6-391	GP2K-390	1FM-34	Hor. Discharge
C87	270	500	J665-47	1468-00025	D6-271	GP2K-270	1FM-325	Hor. Sweep Coupling
C88	.05	600	D827-3	P688-05			TM-15	Hor. Output Screen Bypass
C89	.25	400	D827-17	P488-4			TC-2	Hor. Output Cathode Bypass
C90	18	1500	J666-65					Hor. Feedback
C91	.035	600	D827-46	P688-033				Damper Filter
C92	.1	600	D827-13	P688-1			TM-1	Damper Filter
C93	.25	600	D827-25	684-25			TC-2	Hor. Sweep Coupling
C94	500	10000	K891-2					HV Filter
C95	.01	600	D827-7	P688-01	D6-103		TM-11	Line Filter
C96	.01	600	D827-7	P688-01	D6-103		TM-11	Line Filter

* Some models use 40MFD in this application.
† Some models use .005MFD in this application.
‡ Used only on models with serial numbers larger than 2610000.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	L285-1	B11-137 *			Vert. hold control, panel
B	50KΩ	½		B11-123 *			Horiz. hold control, rear
C	Shaft End			E-187 *			Attach per instructions in "Concentrikit"
R2	1500Ω	4	L268-1		10-1500		Focus control-Wire Wound
R3	100KΩ	½	K915-12	Q11-128	M-49-S	B-40	Brightness control
R4	1000Ω	½	K915-11				Contrast control, tapped @ 750Ω
R5	250KΩ	½	K915-8	Q11-130	M-55-S	B-50	Volume control
R6	2.5 Meg.	½	K915-10	Q11-239	M-84-S	B-83	Vert. size control
R7	5000Ω	½	K915-9	Q11-114	M-19-S	B-10	Vert. linearity control

* Additional parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R8	1 Meg.	½	J569-61		RF Grid
R9	1000Ω	½	J569-25		RF Screen Decoupling
R10	1000Ω	½	J569-25		RF Plate Decoupling
R11	1 Meg.	½	K379-61		Mixer Grid
R12	1000Ω	½	J569-25		Mixer Screen Decoupling
R13	3900Ω	½	J569-32		Mixer Grid Coil Shunt
R14	2200Ω	2	J571-29		Osc. Plate
R15	18KΩ	½	J569-40		Osc. Grid
R16	100Ω	½	J569-13		Decoupling Network-See Note 1
R17	330Ω 5%	½	J569-19		AGC Network
R18	100Ω	½	J569-13		Mixer Plate Decoupling
R19	10KΩ 5%	½	J569-89		1st Video IF Grid
R20	82Ω	½	J569-12		1st Video IF Cathode
R21	100Ω	½	J569-13		1st Video IF Decoupling
R22	330Ω 5%	½	J569-19		AGC Network
R23	8200Ω 5%	½	J569-93		2nd Video IF Grid
R24	82Ω	½	J569-12		2nd Video IF Cathode
R25	100Ω	½	J569-13		2nd Video IF Decoupling
R26	1 Meg.	½	J569-61		AGC Network
R27	8200Ω 5%	½	J569-90		3rd Video IF Grid Coil Shunt
R28	82Ω	½	J569-12		3rd Video IF Cathode
R29	100Ω	½	J569-13		3rd Video IF Decoupling
R30	680KΩ	½	J569-59	BTS-680K	AGC Diode Load
R31	47KΩ	1	J571-45	BTA-47K	Voltage Divider
R32	8200Ω	½	J569-36	BTS-8200	Video Det. Diode Load
R33	1000Ω	½	J569-25	BTS-1000	Bias Network
R34	120Ω	½	J569-14		Parasitic Supp.
R35	27KΩ	5	E959-20		Video Amp. Plate-Wire Wound
R36	22KΩ	5	E959-19		Video Amp. Screen-Wire Wound
R37	22KΩ	1	J571-41	BTA-22K	Voltage Divider
R38	5600Ω	1	J571-34	BTA-5600	Voltage Divider
R39	2200Ω	½	J569-29	BTS-2200	Picture Tube Grid
R40	270KΩ	½	J569-54	BTS-270K	DC Rest. Load
R41	820KΩ	½	J569-60	BTS-820K	Voltage Divider
R42	47KΩ	½	J569-45	BTS-47K	DC Rest. Load
R43	82Ω	½	J569-12		1st Sound IF Cathode

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R44	1000Ω	½	J569-25		1st Sound IF Screen Decoupling
R45	1000Ω	½	J569-25		1st Sound IF Plate Decoupling
R46	470KΩ	½	J569-57		2nd Sound IF Grid
R47	1000Ω	½	J569-25		2nd Sound IF Cathode
R48	100KΩ 5%	½	J569-49		2nd Sound IF Screen
R49	12KΩ	½		BTS-12K	Voltage Divider-See Note 2
R50	1000Ω	½	J569-25		2nd Sound IF Decoupling
R51	15KΩ	½	J569-39	BTS-15K	De-emphasis
R52	47KΩ	½	J569-45	BTS-47K	Ratio Det. Diode Load
R53	470KΩ	½	J569-57	BTS-470K	AF Grid
R54	330KΩ	½	J569-55	BTS-330K	AF Plate
R55	220KΩ	½	J569-53	BTS-220K	Output Grid
R56	4700Ω	½	J569-33	BTS-4700	Voltage Divider
R57	470KΩ	½	J569-57	BTS-470K	Voltage Divider
R58	330KΩ 5%	½	J569-88	BTS-330K-5%	Voltage Divider
R59	180KΩ 5%	½	J569-89	BTS-180K-5%	Voltage Divider
R60	390Ω	1	J571-20	BW-1-390	Filter
R61	1 Meg.	½	J569-61	BTS-1 Meg.	Sync Sep. Grid
R62	3900Ω	½	J569-32	BTS-3900	Sync Sep. Cathode
R63	3900Ω	½	J569-32	BTS-3900	Sync Sep. Plate
R64	3900Ω	½	J569-32	BTS-3900	Sync Sep. Plate
R65	470KΩ	½	J569-57	BTS-470K	Sync Amp. Grid-See Note 3
R66	100KΩ	½	J569-49	BTS-100K	Sync Amp. Plate-See Note 3
R67	22KΩ	½	J569-41	BTS-22K	Integrator
R68	8200Ω	½	J569-36	BTS-8200	Integrator
R69	8200Ω	½	J569-36	BTS-8200	Integrator
R70	1 Meg.	½	J569-61	BTS-1 Meg.	Vert. Osc. Grid
R71	1.5 Meg.	½	J569-63	BTA-1.5 Meg.	Vert. Osc. Plate
R72	6.8 Meg.	½	J569-71	BTS-6.8 Meg.	Voltage Divider
R73	100KΩ 5%	½	J569-49	BTS-100K-5%	Voltage Divider
R74	2.2 Meg.	½	J569-65	BTS-2.2 Meg.	Vert. Amp. Grid
R75	6800Ω	½	J569-35	BTS-6800	Vert. Amp. Plate Decoupling
R76	560Ω	½	J569-22	BTS-560	Vert. Amp. Cathode
R77	3300Ω	½	J569-31	BTS-3300	Vert. Peaking
R78	27KΩ	½	J569-42	BTS-27K	Feedback Network
R79	100KΩ	½	J569-49	BTS-100K	Horiz. Phase Det. Load
R80	100KΩ 5%	½	J569-49	BTS-100K-5%	Horiz. Phase Det. Load
R81	4.7 Meg.	½	J569-69	BTS-4.7 Meg.	Horiz. Phase Det. Load
R82	470KΩ	½	J569-57	BTS-470K	Horiz. AFC Filter Network
R83	5600Ω	½	J569-34	BTS-5600	Horiz. Osc. Plate
R84	1500Ω	½	J569-27	BTS-1500	Horiz. Osc. Cathode
R85	100KΩ 5%	½	J569-49	BTS-100K-5%	Horiz. Osc. Grid
R86	270KΩ	½	J569-54	BTS-270K	Horiz. Osc. Plate Decoupling
R87	22KΩ	½	J569-41	BTS-22K	Filter
R88	56KΩ	½	J569-46	BTS-56K	Filter
R89	68Ω	1	J569-11		Parasitic Supp.
R90	1 Meg.	½	J569-61	BTS-1 Meg.	Horiz. Output Grid
R91	82Ω	1	J571-12	BW-1-82	Horiz. Output Cathode
R92A	12KΩ	2		BT-2-12K	Horiz. Output Screen-See Note 2
B	12KΩ	2		BT-2-12K	Horiz. Output Screen-See Note 2
R93A	12KΩ	10	E959-21	AB-12K	Damper Filter-Wire Wound
B	12KΩ	10	E959-21	AB-12K	Damper Filter-Wire Wound
R94	4700Ω	½	J569-33	BTS-4700	Feedback
R95	3.3Ω	1	K097-42		HV Filament-Wire Wound
R96	1 Meg.	½	J569-61		HV Filter
R97	1800Ω	½		BTS-1800	Focus Coil Shunt-See Note 1
R98	15Ω	½	J569-3	BW-½-15	Bias Network
R99	10KΩ	½	J569-37	BTS-10K	Voltage Divider
R100	220KΩ	½	J569-53	BTS-220K	Voltage Divider
R101	1000Ω	½	J569-25	BTS-1000	Acc. Anode Decoupling

Note 1. Not used in all models.
Note 2. Some models use 10KΩ resistor in this application.
Note 3. Used only on receivers with serial numbers whose first three digits are 261 or larger.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC	800VCT	5VAC	5VAC	L-275-1	P-8154 and P-6134	P-3059	TP-392
	@ 1.8A	.195ADC	@ 3A	@ 2A				

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.	NOTES
T2	116Ω		SA5487				Hor. AFC Transformer
T3	170Ω	1480Ω	L254-1	A-8121 #	A-4000 #	TBO-3	Vert. Osc. Transformer
T4	415Ω Tap	SEC. 1	L255-1	A-8117		TFB-1	Hor. Output Transformer
	@ 177Ω	10.6Ω Tap					
		@ .6Ω					
		SEC. 2					
		0Ω					
T5	575Ω	7Ω	L253-1	A-8116	A-3035	TSO-1	Vert. Output Transformer
T6A	13.8Ω		L251-1	DY-1			Hor. Deflection Coil
B	63Ω						Vert. Deflection Coil
T7	255Ω		L252-1	FC-10 $			Focus Coil

Drill one new mounting hole.
$ Solder on extra mounting screw.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		NATIONAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T8	5KΩ	7Ω	215Ω	.6Ω	E450-1	A-3825	A-2902 #	RO-9	# Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			NOTES
	FIELD RES.	V. C. IMP.	NATIONAL PART No.	VIKING PART No.	QUAM PART No.	
SP1	PM	3.5Ω	K892-1	46J6	46A1	
SP2	PM	3.5Ω	K892-1	46J6	46A1	
	CONE DIA.	V. C. DIA.				
SP3	3 7/8" x 5 7/8"	9/16"				
SP4	3 7/8" x 5 7/8"	9/16"				

FILTER CHOKE

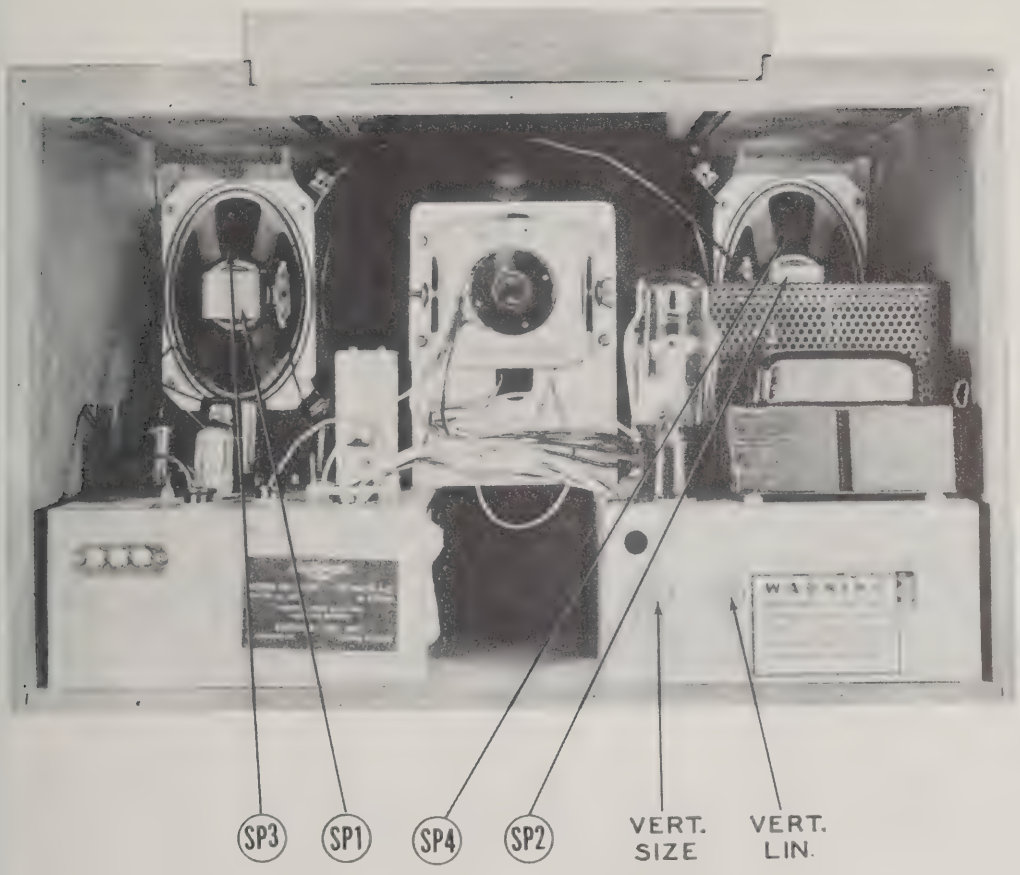
ITEM No.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∽)	NATIONAL PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
L1	.195A	76Ω	3 Henries	K927-1	C-2325	C-2991 #	TR-3300	# Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA		NOTES
		PRI.	SEC.	NATIONAL PART No.	MEISSNER PART No.	
L2	Ant. Coil	0Ω		SA5448		Center Tapped
L3	Ant. Coil	0Ω		L888-1		
L4	RF Grid	0Ω		SA5060-4		Multi-Tapped
L5	RF Plate	0Ω		SA5059-2		
L6	RF Plate	0Ω		SA5055		Multi-Tapped
L7	Mixer Grid	0Ω		SA5059-1		
L8	Mixer Grid	0Ω		SA5060		
L9	Osc. Coil	0Ω		SA5054-6		Channel 8 and 9
L10	Osc. Coil	0Ω		SA5054-5		Channel 7
L11	Osc. Coil	0Ω		SA5054-4		Channel 6
L12	Osc. Coil	0Ω		SA5054-4		Channel 5
L13	Osc. Coil	0Ω		SA5054-3		Channel 4
L14	Osc. Coil	0Ω		SA5054-2		Channel 3
L15	Osc. Coil	0Ω		SA5054-2		Channel 2
L16	Osc. Coil	0Ω		SA5054-7		Channels 12 and 13
L17	Osc. Coil	0Ω		SA5054-7		Channels 10 and 11
L18	Fil. Choke	.1Ω		SA5057		
L19	1st Video IF	.1Ω		SA5002		
L20	2nd Video IF	.1Ω		SA5002		
L21	IF Plate Chk.	1.3Ω		SA5069		
L22	3rd Video IF	.1Ω		SA5002		
L23	IF Plate Chk.	1.3Ω		SA5069		
L24	4th Video IF	.1Ω		SA5002		
L25	Peaking	3.2Ω		SA5489		Wound on 1 Meg. resistor.
L26	Peaking	12Ω		SA5491		Wound on 1 Meg. resistor.
L27	4.5MC Sound Trap	1.5Ω		SA5515		
L28	Peaking	3.8Ω		SA5493		Wound on 18KΩ resistor.
L29	Peaking	11.5Ω		SA5492		Wound on 1 Meg. resistor.
L30	4.5 MC Sound Trap	1.5Ω		SA5515		
L31	Sound IF	1.5Ω	1.5Ω	SA5498		
L32	Ratio Det. Trans.	7Ω	1Ω	SA4997		
L33	Horiz. Size	1Ω		L256-1		
L34	Hor. Linearity	35Ω		L257-1		

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
M1	RF Tuner		
M2	Power Switch	E230-4	Toggle
M3	Tone Switch	E230-4	Toggle
M4	Ion Trap	L260	PM
M5	Fuse	F135-9	3A
	Plug	L266-1	11 Pin
	Plug	L264-1	Single Pin
	Plug	K294-1	Two Pin
	Socket	L267-1	11 Pin
	Socket	L265-1	Single Pin
	Socket	K293	Two Pin



CABINET-REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune in a test pattern from a TV station.

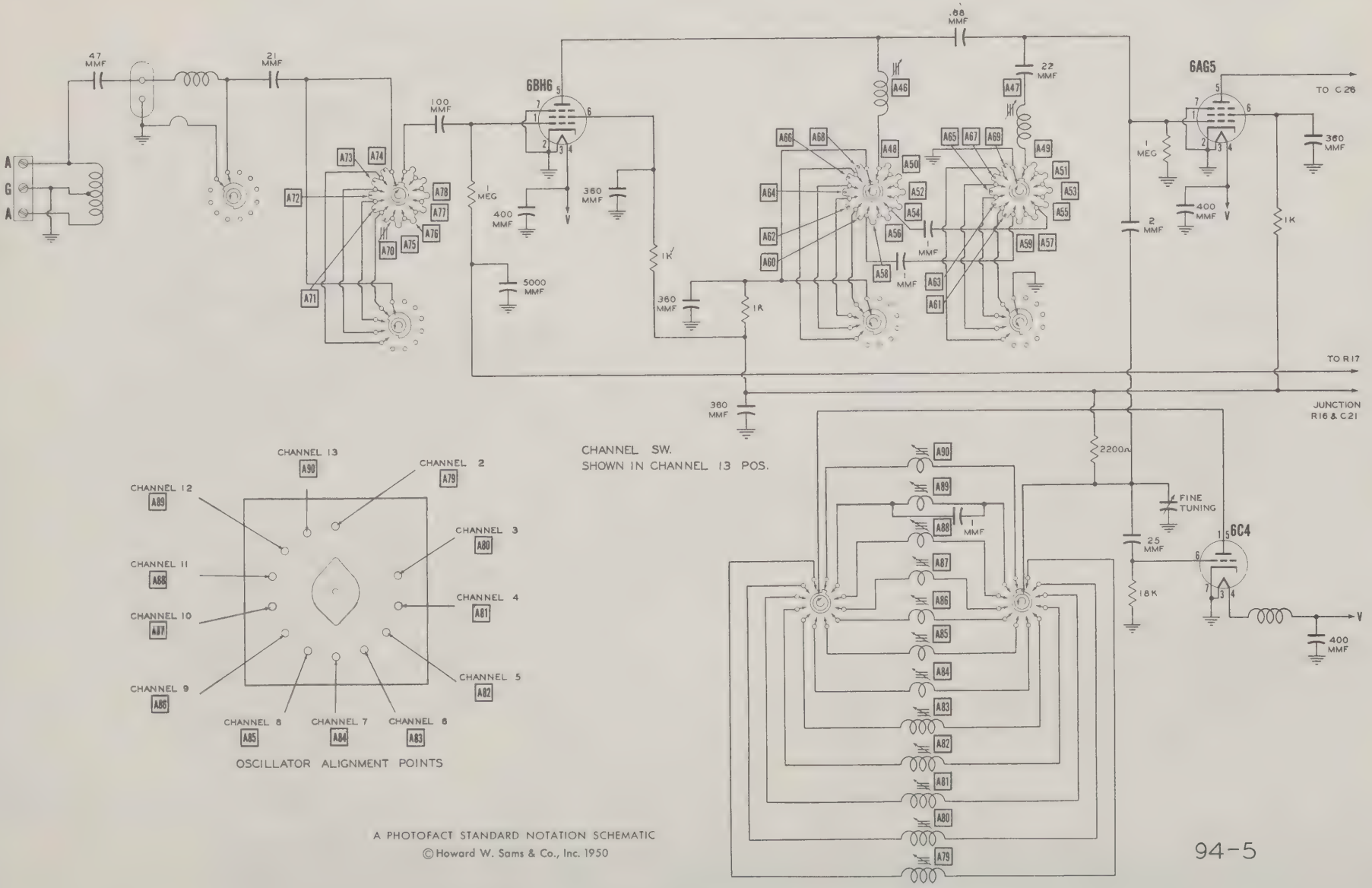
Set the horizontal hold control to the center of its range. Adjust B1 until picture syncs normally in the horizontal plane. Picture should remain in sync as the horizontal hold control is turned several degrees to either side of its center position.

Adjust the horizontal drive trimmer (B2) clockwise as far as possible without crowding the left hand side of the picture.

Adjust the horizontal size slug (B3) so test pattern fills the mask horizontally.

Adjust the horizontal linearity slug (B4) for best horizontal linearity of picture.

Adjustments B2, B3, and B4 are interacting and may require alternate adjustment to obtain optimum results.



CHANNEL SW.
SHOWN IN CHANNEL 13 POS.

OSCILLATOR ALIGNMENT POINTS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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94-5

12 CHANNEL ALTERNATE TUNER

PHOTOFACT* Folder

PACKARD-BELL

MODEL 2991TV

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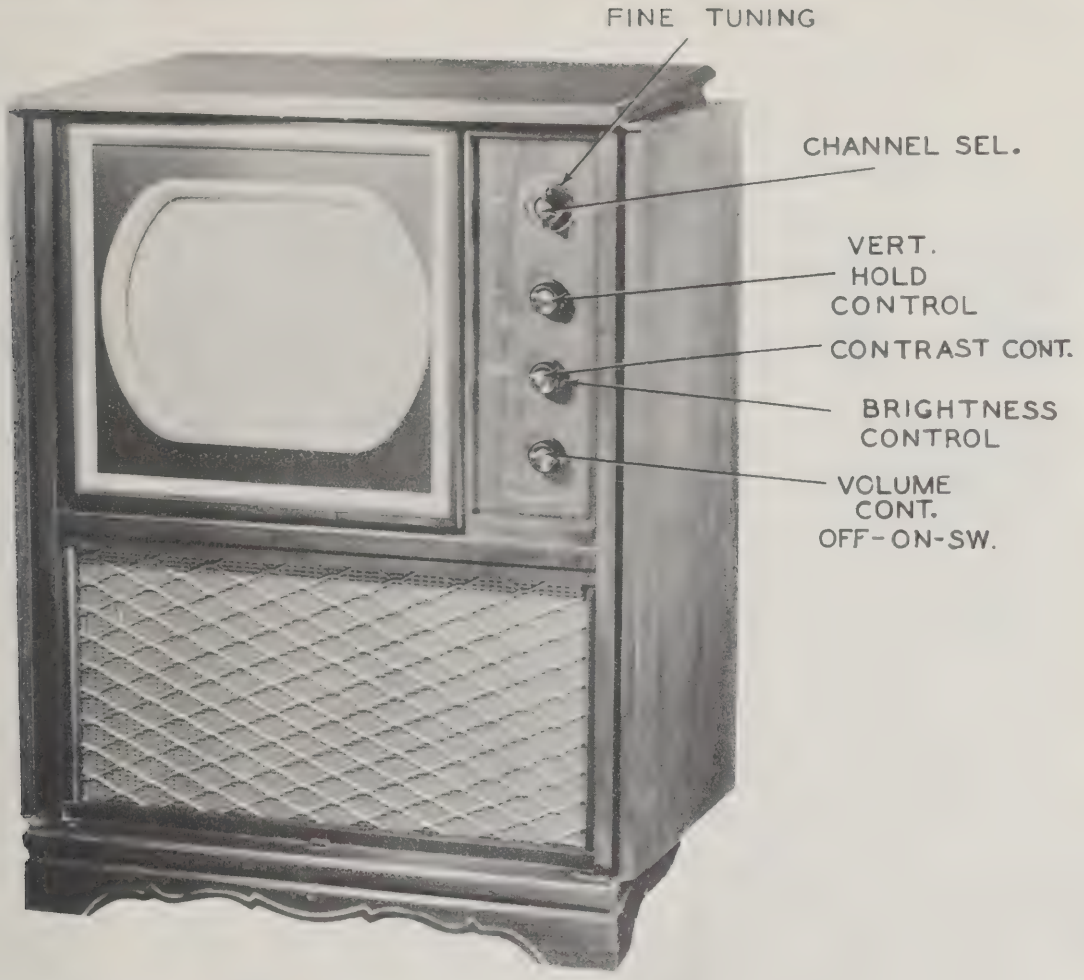

PACKARD-BELL
MODEL 2991TV

PACKARD-BELL MODEL 2991TV

TRADE NAME	Packard-Bell, Model 2991TV
MANUFACTURER	Packard-Bell Co., 3443 Wilshire Blvd., Los Angeles, California
TYPE SET	Televison Receiver
TUBES	Twenty Nine
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	2.72 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13

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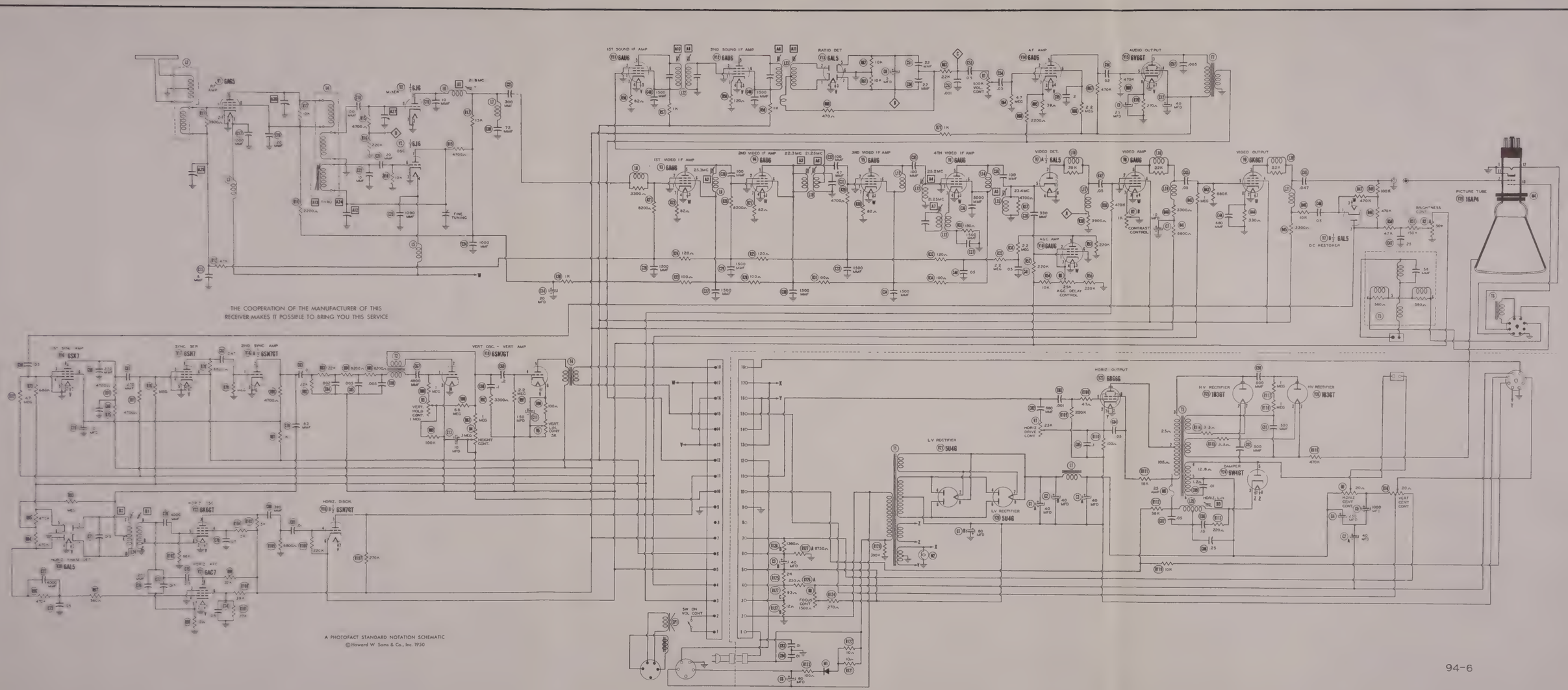

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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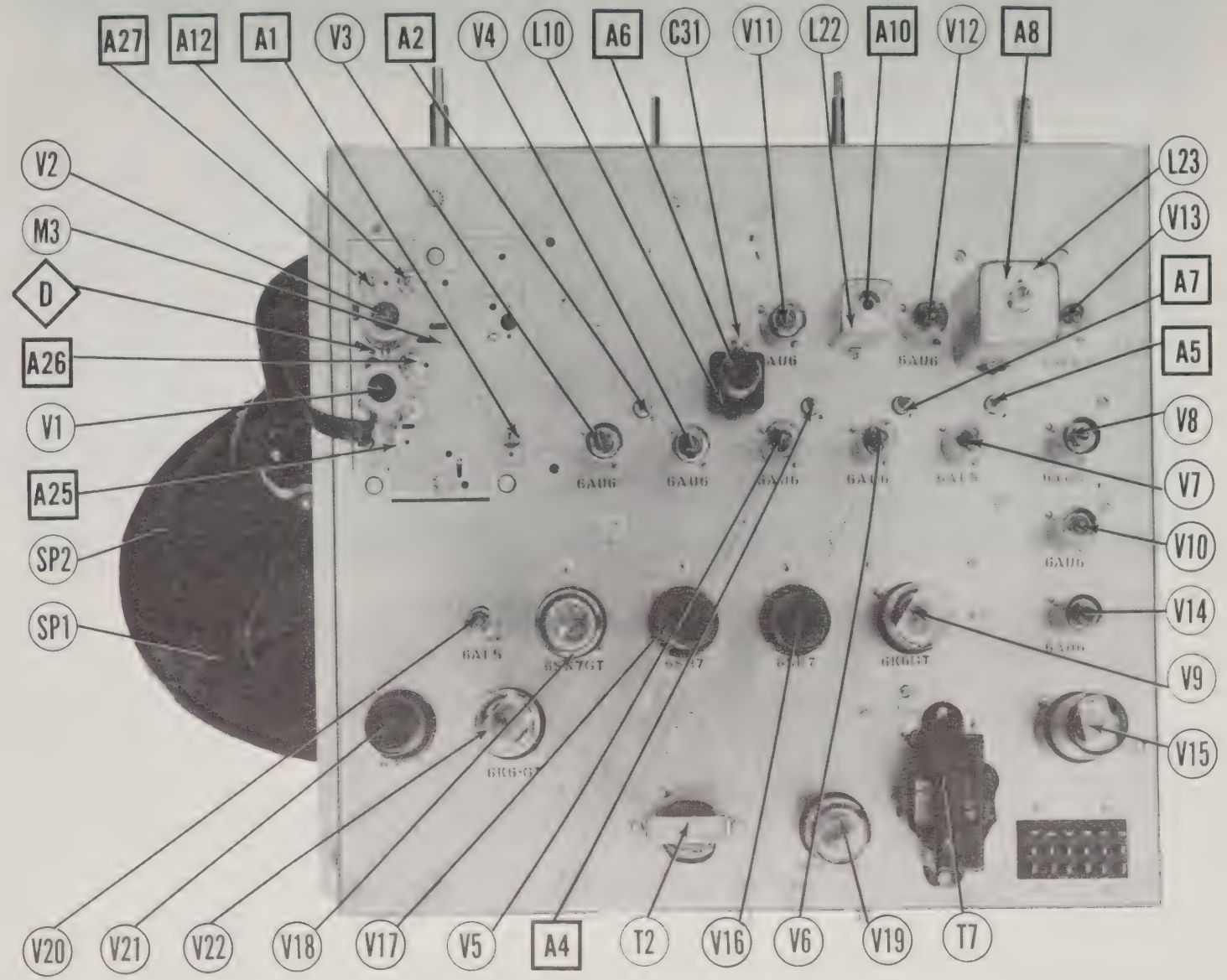
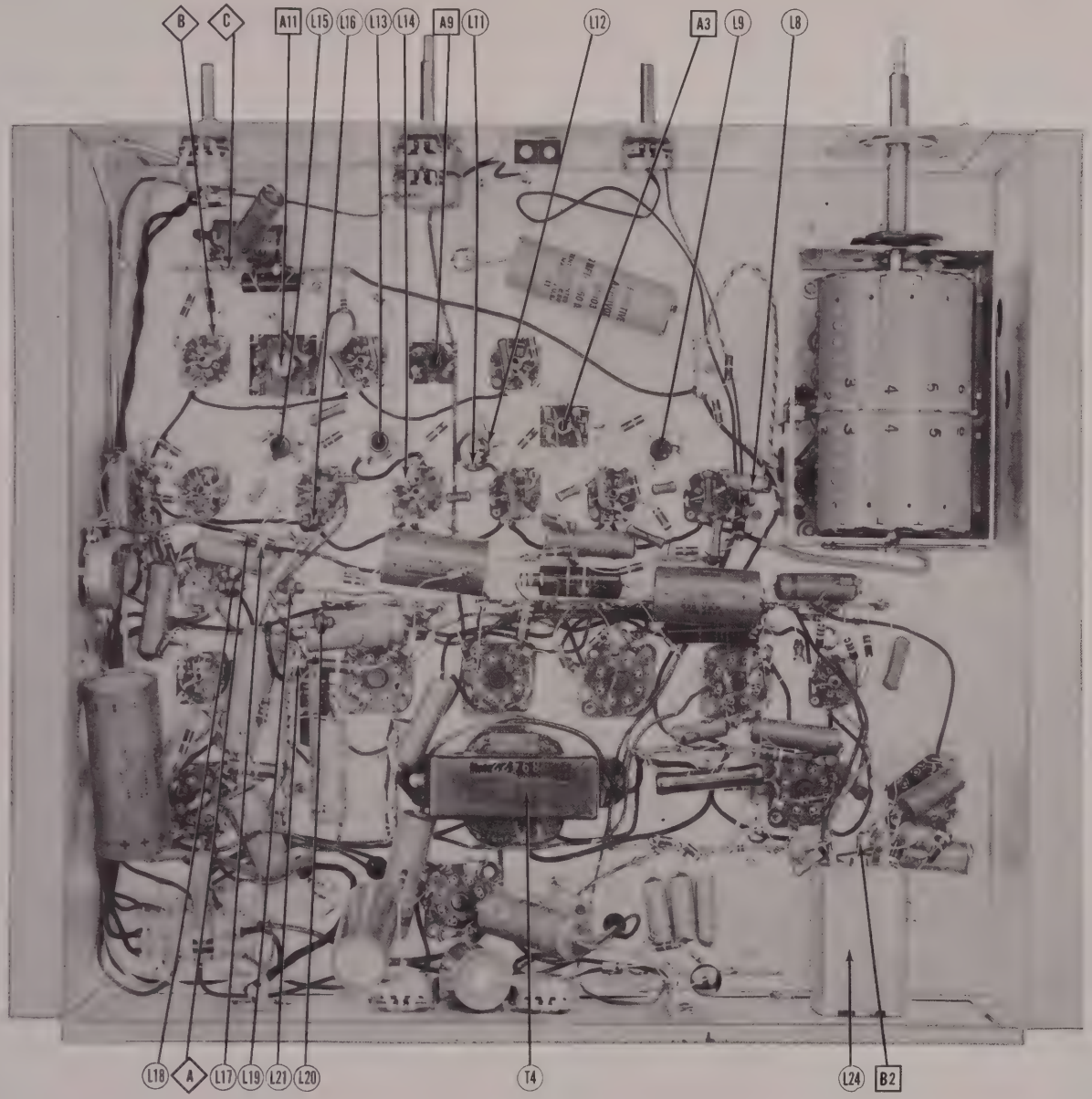
94-6

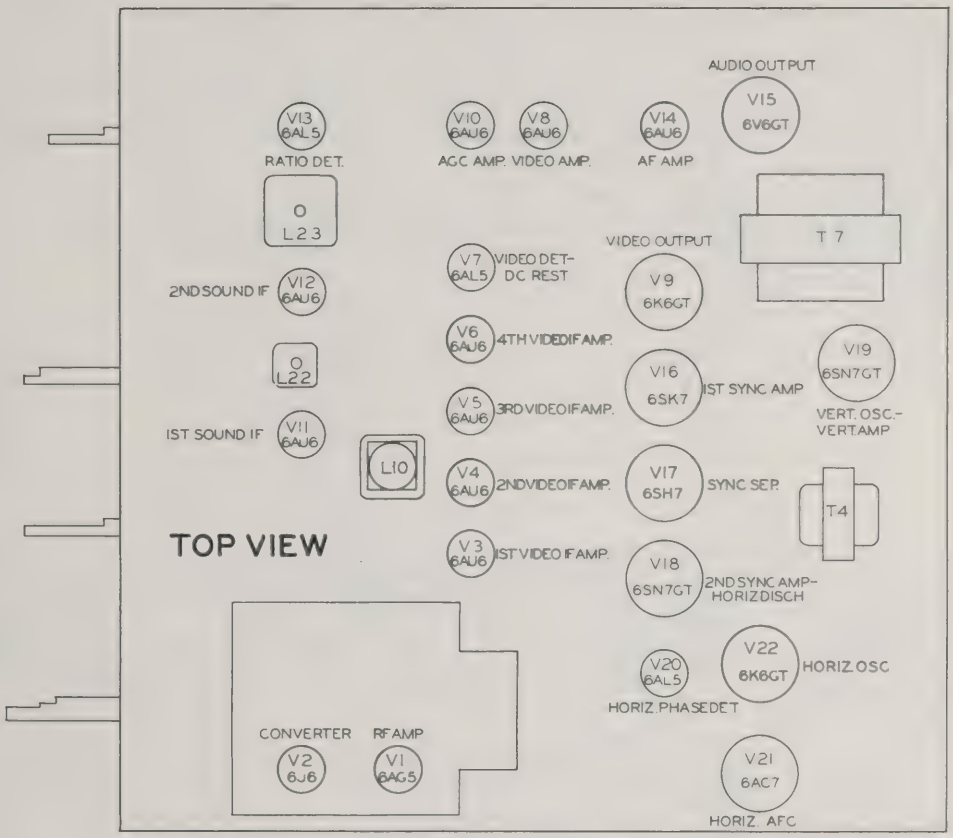
PACKARD-BELL
MODEL 2991TV

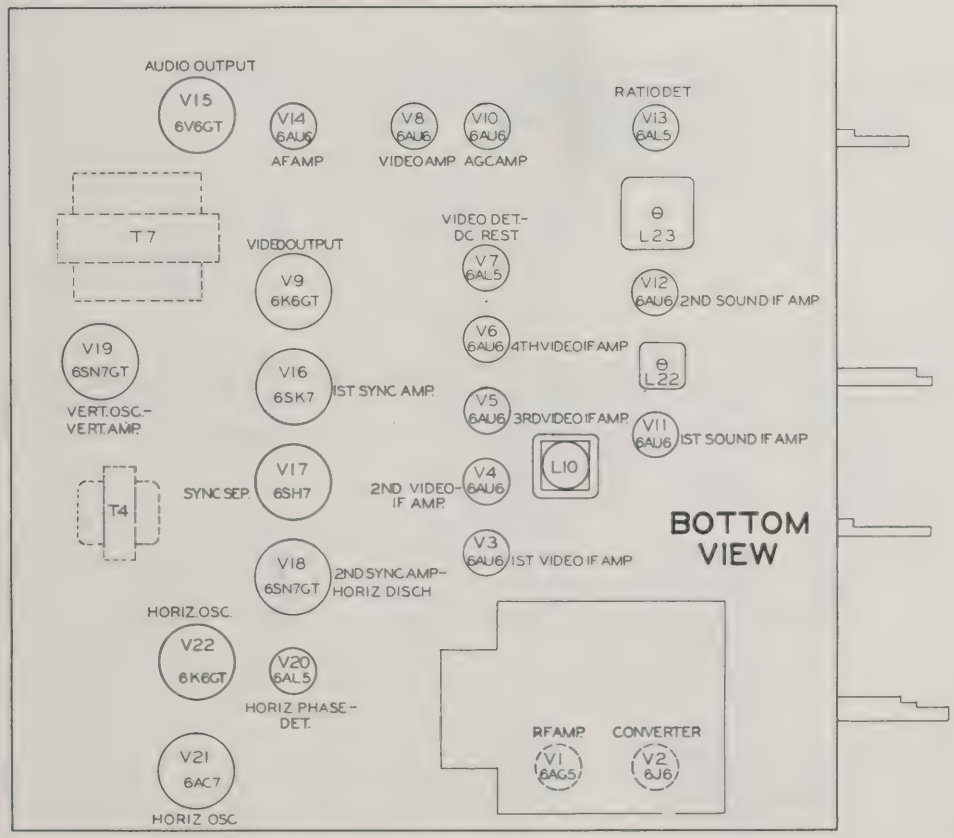


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal oscillator tube (V22) from its socket.
Do not attempt to operate this set without the focus and deflection coils connected.
The early and late versions of this receiver have different IF frequencies. The later version, identified by a black "C" stamped on the rear of the tuner chassis, uses the frequencies identified by an asterick (*). The frequencies used in the earlier version will be indicated by a dagger (†).

VIDEO IF ALIGNMENT

Remove the AGC amplifier tube (V10) from its socket.
Connect the negative lead of a 3 volt battery to pin 5 of V10 socket, connect the positive lead to chassis.
Remove the channel 13 segment of the converter section of the tuner turret, and turn the channel switch to 13 to disable the local oscillator and prevent erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	21.8MC † 21.05MC * (Unmod.)	Any	DC Probe to Point (A) Low side to chassis.	A1	Adjust for maximum deflection.
2.	Direct	"	25.3MC † 24.55MC *	"	"	A2	"
3.	Direct	"	22.3MC † 21.55MC *	"	"	A3	"
4.	Direct	"	25.2MC † 24.45MC *	"	"	A4	"
5.	Direct	"	23.4MC † 22.65MC *	"	"	A5	"
6.	Direct	"	21.25MC † 20.5MC *	"	"	A6, A7	Adjust for minimum deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	24MC (10MC SWP)	21.25MC † 20.5MC * 22.3MC † 21.55MC * 25.75MC † 25.0MC *	Any	Vert. Amp. to Point (A) Low side to chassis.		Check for response curve similar to Fig 1. If necessary retouch A1 thru A7 for proper response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8.	.01MFD	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	21.25MC † 20.5MC *	Any	DC Probe to Point (B) Common to chassis.	A8, A9, A10	Adjust for maximum deflection.
9.	.01MFD	"	"	"	DC Probe to Point (C) Common to chassis.	A11	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 % modulation and 450KC sweep. Use 120 % sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	01MFD	High side to pin 1 (Grid) of 6AU6 (V4). Low side to chassis.	21.25MC † 20.5MC * (450KC SWP)	21.25MC † 20.5MC *	Any	Vert. Amp. to Point (B) Low side to chassis.	A8, A9, A10	Disconnect stabilizer capacitor C8. Adjust for maximum amplitude and symmetry as per Fig 2.
9.	.01MFD	"	"	"	"	Vert. Amp. to Point (C) Low side to chassis.	A11	Reconnect capacitor C8. Adjust A11 so marker occurs at center of crossover lines as per Fig 3. Slightly retouch A8 for maximum amplitude and straightness of crossover lines.

OSCILLATOR ALIGNMENT

Replace the channel 13 segment of the tuner turret.
Complete oscillator alignment may not be necessary.
If the oscillator seems to be off frequency approximately the same amount, for a majority of the channels, it may be possible to correct them in one step using A12. It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjustment of A12 will not bring all channels within the range of the fine tuning control, it will be necessary to use the individual channel oscillator adjustments for each channel that is off frequency.
The individual channel oscillator adjustments are reached thru a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as the channel switch is turned to each channel.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	215.75MC (Unmod.)	13	DC Probe to Point (C) Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
			209.75MC (Unmod.)	12		A14	
			203.75MC (Unmod.)	11		A15	
			197.75MC (Unmod.)	10		A16	
			191.75MC (Unmod.)	9		A17	
			185.75MC (Unmod.)	8		A18	
			179.75MC (Unmod.)	7		A19	
			87.75MC (Unmod.)	6		A20	
			81.75MC (Unmod.)	5		A21	
			71.75MC (Unmod.)	4		A22	
			65.75MC (Unmod.)	3		A23	
			59.75MC (Unmod.)	2		A24	

ALIGNMENT INSTRUCTIONS (CONT.)

RF ALIGNMENT

The RF and mixer circuits in this receiver are pre-set at the factory and are very stable. Alignment of these circuits should not be attempted unless they are definitely known to be out of alignment.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	207MC (10MC SWP)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point ◇ Low side to chassis.	A25, A26, A27	Adjust for response curve similar to Fig 4 with markers above 70%.
12.	"	"	213MC (10MC SWP)	211.25MC 215.75MC	13	"		Check all channels for response curve similar to Fig 4. If markers fall below 70% on any channel make slight adjustment of A25, A26 and A27 with channel selector set for that channel. Recheck all channels to see that they have not been seriously effected.
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
			85MC (10MC SWP)	83.25MC 87.75MC	6			
			79MC (10MC SWP)	77.25MC 81.75MC	5			
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

AGC DELAY ADJUSTMENT

Turn the contrast control to maximum clockwise and the brightness control to approximately normal.
Adjust the AGC delay control until the picture contrast is slightly above normal.

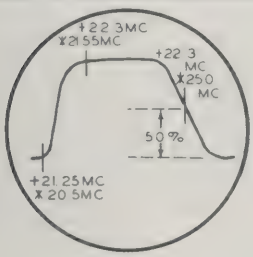


FIG. 1

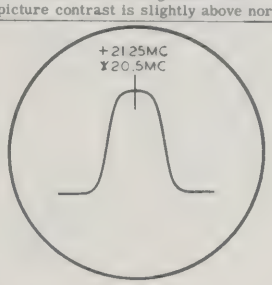


FIG. 2

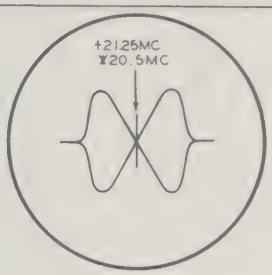


FIG. 3

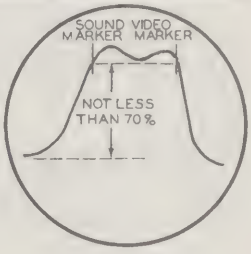
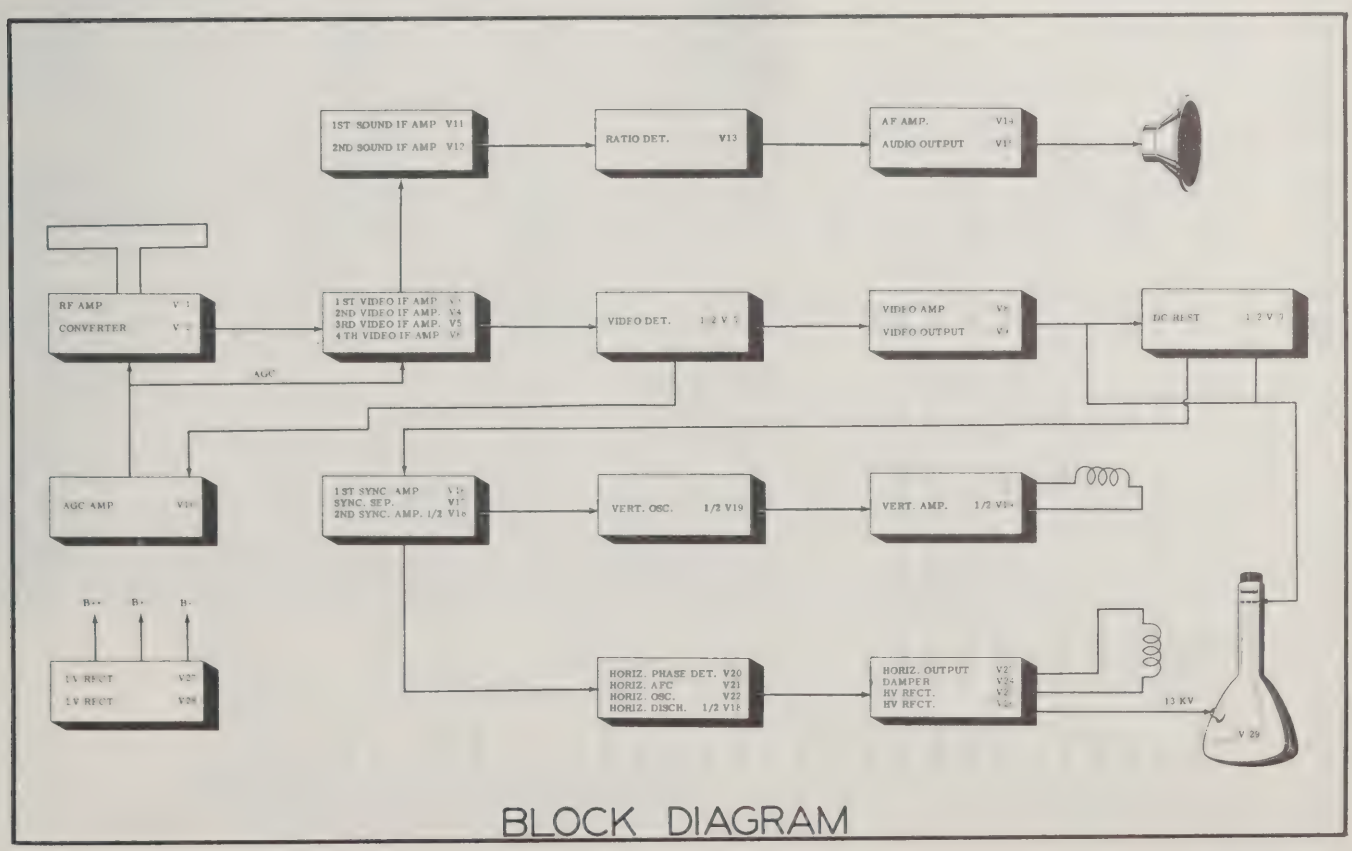


FIG. 4



BLOCK DIAGRAM

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	-.7VDC	0V.	6.3VAC	0V.	100VDC	100VDC	0V.		
V 2	6J6	80VDC	85VDC	0V.	6.3VAC	-.6VDC	§-1.5VDC	0V.		
V 3	6AU6	-2.9VDC	0V.	6.3VAC	0V.	140VDC	140VDC	.4VDC		
V 4	6AU6	-.4VDC	0V.	6.3VAC	0V.	140VDC	140VDC	.4VDC		
V 5	6AU6	-.4VDC	0V.	6.3VAC	0V.	130VDC	130VDC	.4VDC		
V 6	6AU6	0V.	0V.	6.3VAC	0V.	130VDC	130VDC	1.1VDC		
V 7	6AL5	-85VDC	-.3VDC	6.3VAC	0V.	0V.	0V.	-100VDC		
V 8	6AU6	-.7VDC	0V.	0V.	6.3VAC	290VDC	140VDC	.9VDC		
V 9	6K6GT	0V.	0V.	110VDC	140VDC	-6VDC	0V.	6.3VAC	4VDC	
V 10	6AU6	-100VDC	-100VDC	6.3VAC	0V.	0V.	0V.	-100VDC		
V 11	6AU6	0V.	0V.	6.3VAC	0V.	125VDC	125VDC	.8VDC		
V 12	6AU6	0V.	0V.	6.3VAC	0V.	125VDC	125VDC	1 VDC		
V 13	6AL5	-5.5VDC	0V.	6.3VAC	0V.	.25VDC	0V.	-.25VDC		
V 14	6AU6	-4VDC	0V.	0V.	6.3VAC	120VDC	24VDC	0V.		
V 15	6V6GT	0V.	0V.	205VDC	210VDC	0V.	0V.	6.3VAC	11VDC	
V 16	6SK7	0V.	0V.	0V.	-1.2VDC	0V.	125VDC	6.3VAC	170VDC	
V 17	6SH7	0V.	0V.	0V.	-1 VDC	0V.	140VDC	6.3VAC	135VDC	
V 18	6SN7GT	-.5VDC	90VDC	0V.	-.4VDC	‡85VDC	0V.	6.3VAC	0V.	
V 19	6SN7GT	‡-75VDC	‡80VDC ‡205VDC	0V.	0V.	‡400VDC	‡ 1 VDC ‡26VDC	6.3VAC	0V.	
V 20	6AL5	-.7VDC	-3.6VDC	6.3VAC	0V.	0V.	0V.	-9VDC		
V 21	6AC7	0V.	0V.	0V.	-.7VDC	0V.	100VDC	6.3VAC	290VDC	
V 22	6K6GT	0V.	0V.	195VDC	205VDC	-29VDC	0V.	6.3VAC	0V:	
V 23	6BG6G	0V.	0V.	‡ 11VDC	‡5.7VDC	‡5.8VDC	0V.	6.3VAC	‡280VDC	TOP CAP *
V 24	6W4GT	0V.	0V.	420VDC	0V.	300VDC	0V.	¶	¶	
V 25	1B3GT	* DO NOT MEASURE.								
V 26	1B3GT	* DO NOT MEASURE.								
V 27	5U4G	0V.	290VDC	0V.	350VAC	0V.	350VAC	0V.	290VDC	
V 28	5U4G	0V.	290VDC	0V.	350VAC	0V.	350VAC	0V.	290VDC	
V 29	16AP4	0V.	-95VDC	PIN 10 405VDC	PIN 11 0V.	PIN 12 6.3VAC				

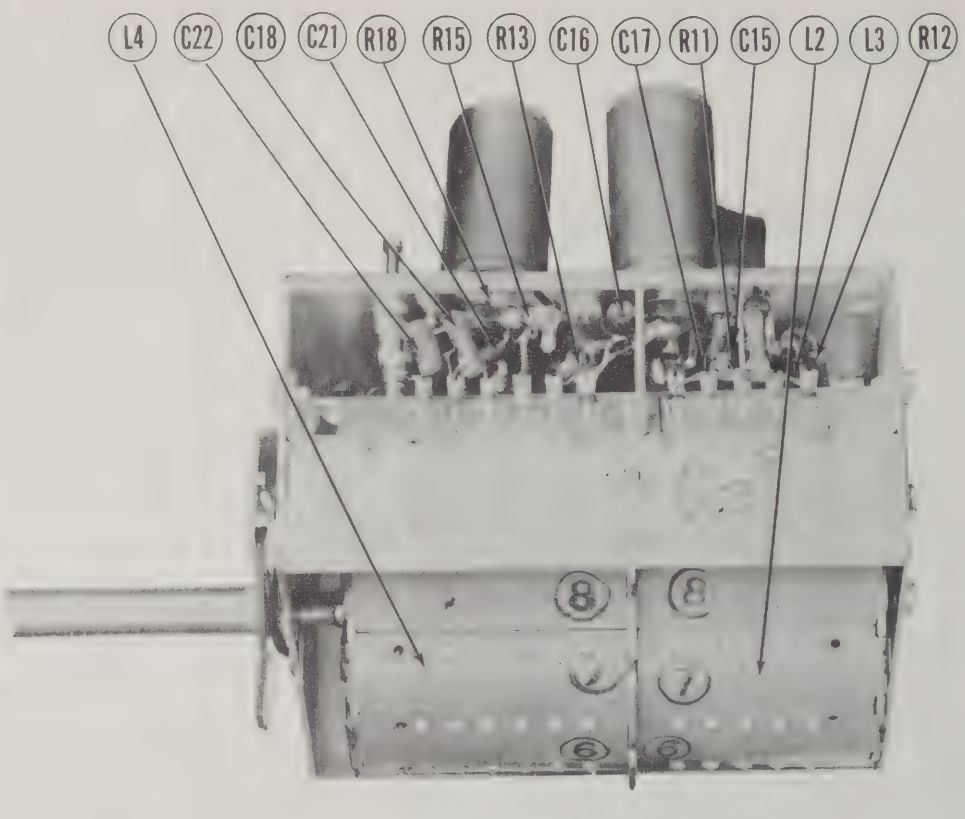
* DO NOT MEASURE.
† MEASURED FROM PIN 3 OF V19.
§ TAKEN WITH VACUUM TUBE VOLTMETER.
¶ 6.3VAC MEASURED ACROSS FILAMENTS.

RESISTANCE READINGS

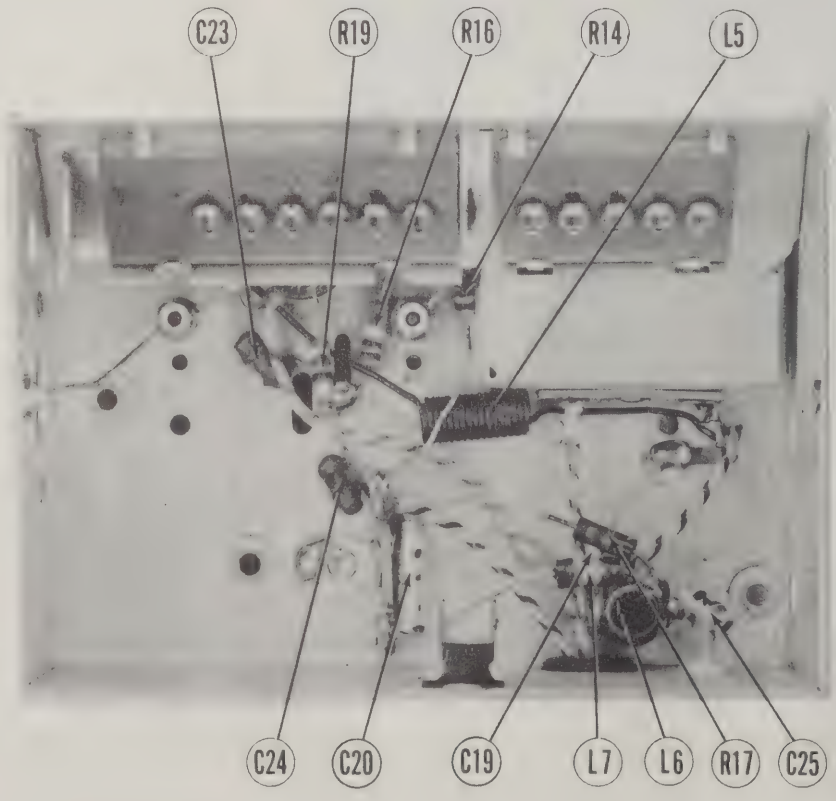
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	5 Meg.	0Ω	.1Ω	0Ω	†4.7KΩ	†4.7KΩ	0Ω		
V 2	6J6	†8KΩ	†17.5KΩ	0Ω	.1Ω	225KΩ	10KΩ	0Ω		
V 3	6AU6	5 Meg.	0Ω	.1Ω	0Ω	†1.6KΩ	†1.6KΩ	82Ω		
V 4	6AU6	5 Meg.	0Ω	.1Ω	0Ω	†1.7KΩ	†1.7KΩ	82Ω		
V 5	6AU6	4.5 Meg.	0Ω	.1Ω	0Ω	†1.8KΩ	†1.8KΩ	82Ω		
V 6	6AU6	.1Ω	0Ω	.1Ω	0Ω	†2KΩ	†2KΩ	180Ω		
V 7	6AL5	1.1 Meg.	3.9KΩ	.1Ω	0Ω	0Ω	0Ω	200KΩ		
V 8	6AU6	500KΩ	0Ω	0Ω	.1Ω	†10.3KΩ	†1.5KΩ	1KΩ		
V 9	6K6GT	0Ω	0Ω	†5KΩ	†1.5KΩ	380KΩ	Inf.	.1Ω	330Ω	
V 10	6AU6	245KΩ	35KΩ 12KΩ	.1Ω	0Ω	220KΩ	0Ω	35KΩ 12KΩ		
V 11	6AU6	0Ω	0Ω	.1Ω	0Ω	†2.5KΩ	†2.5KΩ	82Ω		
V 12	6AU6	0Ω	0Ω	.1Ω	0Ω	†2.5KΩ	†2.5KΩ	120Ω		
V 13	6AL5	Inf.	Inf.	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 14	6AU6	4.7 Meg.	0Ω	0Ω	.1Ω	†470KΩ	†2.3 Meg.	38Ω		
V 15	6V6GT	0Ω	0Ω	†1.7KΩ	†1.1KΩ	470KΩ	1.5Ω	.1Ω	270Ω	
V 16	6SK7	0Ω	0Ω	0Ω	650KΩ	0Ω	†25KΩ	.1Ω	†10KΩ	
V 17	6SH7	0Ω	0Ω	0Ω	750KΩ	0Ω	†1.5KΩ	.1Ω	†8.5KΩ	
V 18	6SN7GT	1 Meg.	†7.2KΩ	0Ω	‡220KΩ	†270KΩ	‡0Ω	.1Ω	0Ω	
V 19	6SN7GT	2 Meg.	♦2 Meg. ♦900KΩ	0Ω	‡2.2 Meg.	†1KΩ	‡ 5KΩ ‡100Ω	.1Ω	0Ω	
V 20	6AL5	1 Meg.	1.5 Meg.	.1Ω	0Ω	0Ω	0Ω	1.5 Meg.		
V 21	6AC7	0Ω	0Ω	0Ω	1.5 Meg.	10Ω	27KΩ	.1Ω	22KΩ	
V 22	6K6GT	0Ω	0Ω	†5KΩ	†10KΩ	68KΩ	Inf.	.1Ω	11Ω	
V 23	6BG6G	0Ω	0Ω	‡100Ω	‡220KΩ	‡220KΩ	Inf.	.1Ω	♦20KΩ	TOP CAP 120Ω
V 24	6W4GT	Inf.	Inf.	3 Meg.	Inf.	†55Ω	Inf.	Inf.	Inf.	
V 25	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ♦150Ω
V 26	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP Inf.
V 27	5U4G	Inf.	8KΩ	Inf.	‡15Ω	Inf.	‡15Ω	Inf.	8KΩ	
V 28	5U4G	Inf.	8KΩ	Inf.	‡15Ω	Inf.	‡15Ω	Inf.	8KΩ	
V 29	16AP4	0Ω	700KΩ	PIN 10 ♦65KΩ	PIN 11 0Ω	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V27.
‡ MEASURED FROM PIN 3 OF V19.
♦ MEASURED FROM PIN 3 OF V24.

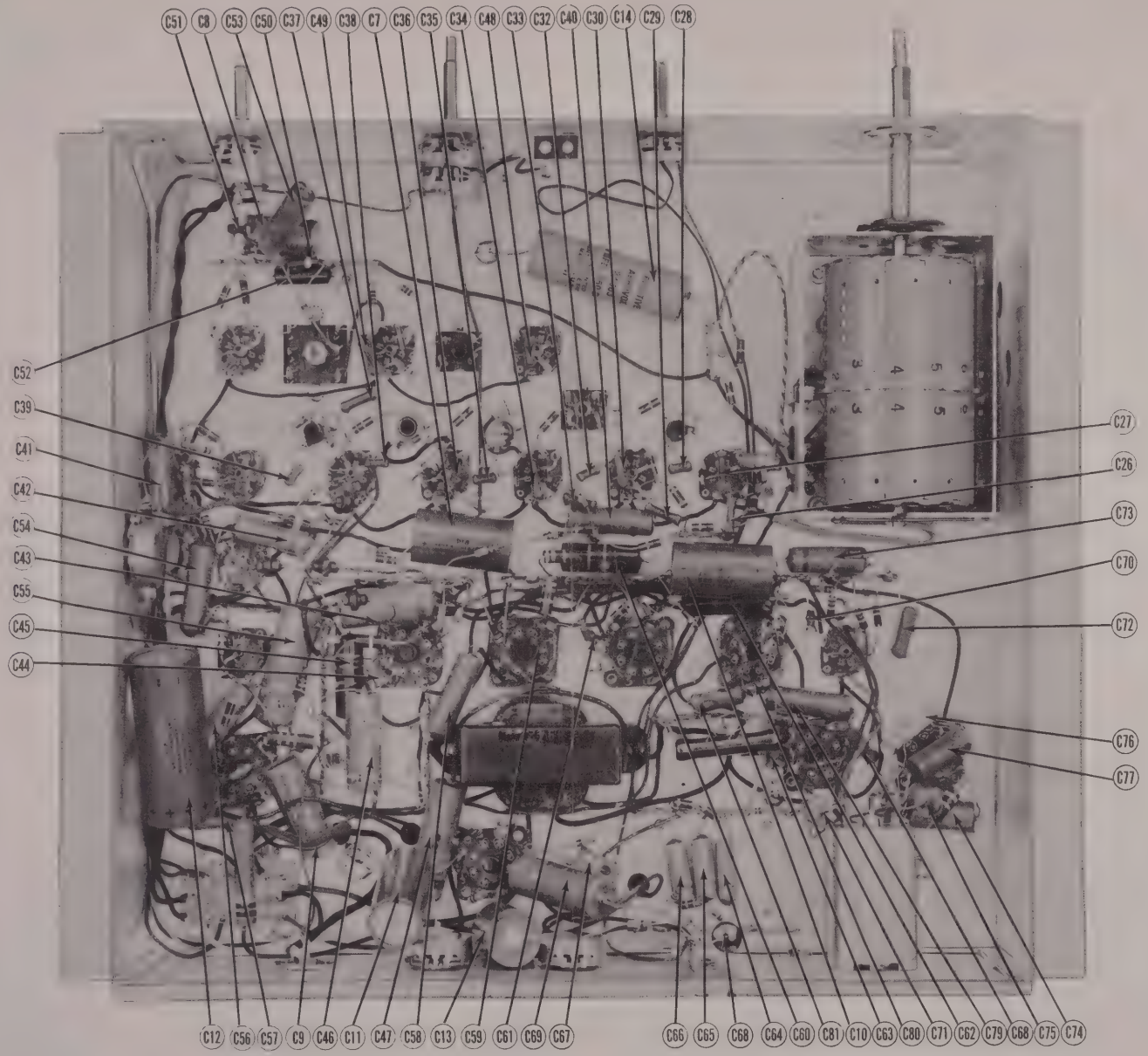
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



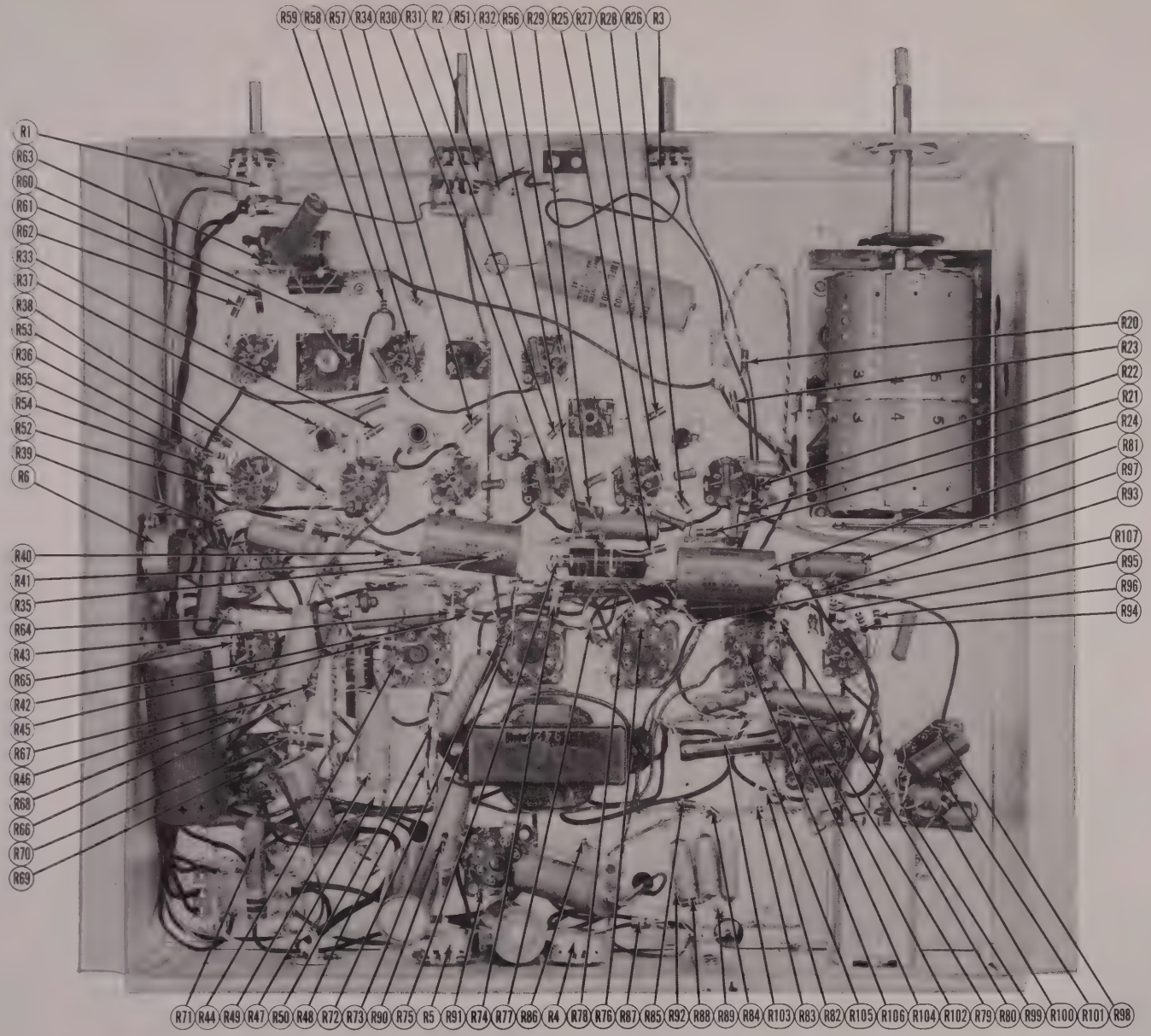
RF TUNER-RIGHT SIDE



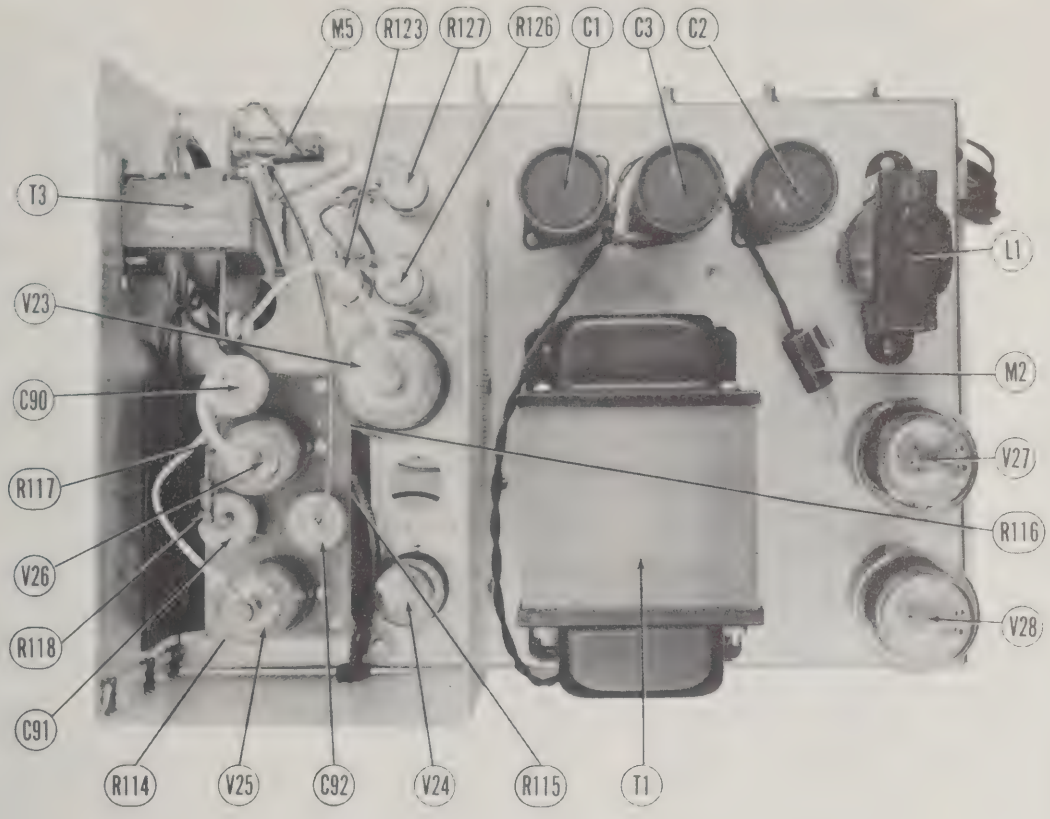
RF TUNER-BOTTOM VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



POWER SUPPLY CHASSIS-TOP VIEW

POWER SUPPLY CHASSIS-BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp		6AG5	6AG5	7BD
V2	Converter		6J6	6J6	7BF
V3	1st Video IF		6AU6	6AU6	7BK
V4	2nd Video IF		6AU6	6AU6	7BK
V5	3rd Video IF		6AU6	6AU6	7BK
V6	4th Video IF		6AU6	6AU6	7BK
V7	Video Det -DC Restorer		6AL5	6AL5	6BT
V8	Video Amp		6AU6	6AU6	7BK
V9	Video Output		6K6GT	6K6GT	7S
V10	AGC Amp.		6AU6	6AU6	7BK
V11	1st Sound IF		6AU6	6AU6	7BK
V12	2nd Sound IF		6AU6	6AU6	7BK
V13	Ratio Det		6AL5	6AL5	6BT
V14	AF Amp		6AU6	6AU6	7BK
V15	Audio Output		6V6GT	6V6GT	7AC
V16	1st Sync. Amp		6SK7	6SK7	8N
V17	Sync. Sep.		6SH7	6SH7	8BK
V18	2nd Sync. Amp - Hor. Disch.		6SN7GT	6SN7GT	8BD
V19	Vert. Osc - Vert. Amp.		6SN7GT	6SN7GT	8BD
V20	Hor. Phase Det.		6AL5	6AL5	6BT
V21	Hor. AFC		6AC7	6AC7	8N
V22	Hor. Oscillator		6K6GT	6K6GT	7S
V23	Hor. Output		6BG6G	6BG6G	5BT
V24	Damper		6W4GT	6W4GT	4CG
V25	HV Rectifier		1B3GT	1B3GT	3C
V26	HV Rectifier		1B3GT	1B3GT	3C
V27	LV Rectifier		5U4G	5U4G	5T
V28	LV Rectifier		5U4G	5U4G	5T
V29	Picture Tube		16AP4	16AP4	12D

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	40	450	24054	AF8J16D			TVL-54	▲ Filter
B	80	150						▲ Filter
C2A	40	450	24053	AF88J			TVL-64	▲ Filter
B	40	450						▲ Filter
C3A	40	450	24053	AF88J			TVL-64	▲ Filter
B	40	450						▲ Filter
C4	250	10	24044	PRS12/250			TVA-3	Hor. Cent. Cont. Bypass
C5	1000	6	24045	PRS6/1000			TVA-1	Vert. Cent. Cont. Bypass
C6	80	150		PRS150/300			TVA-19	Filter
C7	10	450	24002	PRS450/10			TVA-21	Low Pass Filter
C8	5	50	24038	PRS150/4			TVA-13	Stabilizing Cap.
C9	25	25	24006	PRS25/25			TVA-6	Output Cathode Bypass
C10	10	450	24002	PRS450/10			TVA-21	Decoupling
C11	150	50	24053	PRS50/100 #			TVA-16 #	Vert. Output Cath. Bypass
				PRS50/50			TVA-17	
C12	40	450	24030	PRS450/40			TVA-24	Decoupling
C13	10	450	24050	PRS450/30			TVA-21	Vert. Osc. Decoupling
C14	20	350	24003	PRS350/24			TVA-22	Decoupling
C15	5			SI5DNPO	D2-4.7	NPOK-5		Fixed Trimmer
C16	120			GP120M	D6-121	GP2K-120		RF Decoupling
C17	1000			GP1000M	D6-102	GP2L-001		RF Filament Bypass
C18	100			SI100EN750	DN-100	N750L-100		RF Coupling
C19	10			SI10JNPO	D2-10	NPOK-10		Fixed Trimmer
C20	72			CN72JNPO		NPOL-72		Fixed Trimmer
C21	20			SI20KNPO	D2-20	NPOK-20		Osc. Grid Cap.
C22	10			SI10EN750	DN-750	N750K-10		Fixed Trimmer
C23	1000			GP1000M	D6-102	GP2L-001		Osc. Fil. Bypass
C24	1000			GP1000M	D6-102	GP2L-001		RF Bypass
C25	300			GP300M	D6-301	GP2K-300		IF Coupling
C26	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	AGC Filter
C27	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	1st V. IF Decoupling
C28	100		23914	GP100M	D6-101	GP1K-100	IFM-31	IF Coupling
C29	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	AGC Filter
C30	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	2nd V. IF Decoupling
C31	47			CN47JNPO	D2-47	NPOM-50	MS-45	Fixed Trimmer
C32	100		23914	GP100M	D6-101	GP1K-100	IFM-31	IF Coupling
C33	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	AGC Filter
C34	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	3rd V. IF Decoupling
C35	100		23914	GP100M	D6-101	GP1K-100	IFM-31	IF Coupling
C36	5000		23931	BPD-5	D6-502	811-005	29C1	4th V. IF Decoupling
C37	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	4th V. IF Cath. Bypass
C38	100		23914	GP100M	D6-101	GP1K-100	IFM-31	IF Coupling
C39	330		23944	GP330M	D6-331	GP2K-330	IFM-335	IF Coupling
C40	.05	200	23017	P288-05			TM-15	AGC Filter
C41	.05	200	23017	P288-05			TM-15	AGC Filter *
C42	.05	200	23017	P288-05			TM-15	Video Coupling
C43	.05	600	23010	P688-05			TM-15	Video Coupling
C44	680		23946	GP680M	D6-681	GP2K-680	IFM-37	2nd V. Amp. Cathode Bypass
C45	.047	600	23010	P688-047			TM-15	Video Coupling
C46	.05	600	23010	P688-05			TM-15	Video Coupling
C47	25	200	23021	P488-25			TC-2	DC Res. Plate Decoupling
C48	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	1st S. IF Decoupling
C49	1500		23936	GP1500M	D6-152	GP2L-0015	IFM-215	2nd S. IF Decoupling
C50	22		23911	GP22M	D6-220	GP1K-22	MS-425	Diode Load Cap. †
C51	22		23911	GP22M	D6-220	GP1K-22	MS-425	Diode Load Cap. †
C52	.001	600	23001	P688-001	D6-102	GP2L-001	TM-21	De-emphasis
C53	.05	200	23017	P288-05			TM-15	Audio Coupling
C54	.05	200	23017	P288-05			TM-15	Audio Coupling
C55	2	400	23018	P488-22			TC-2	AF Amp. Screen Bypass
C56	.02	600	23007	P688-02			TM-12	Audio Coupling
C57	.005	600	23004	P688-005	D6-502	811-005	TM-25	Output Plate Bypass
C58	.05	200	23017	P288-05			TM-15	Sync. Coupling
C59	270		23943	GP270M	D6-271	GP2K-270	IFM-325	1st Sync. Amp. Plate Bypass
C60	.1	400	23011	P488-1			TM-1	1st Sync. Amp. Plate Decoup.
C61	270		23943	GP270M	D6-271	GP2K-270	IFM-325	Sync. Coupling

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CENTRALAB PART No.	REPLACEMENT DATA: ERIE PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C62	.047	600	23010	P688-047			TM-15	Sync. Coupling
C63	.01	500	23023	P688-01	D6-103	821-01	TM-11	Vert. Sync. Coupling
C64	.002	600	23002	P688-002	D6-202	GP2M-002	TM-22	Integrator Net.
C65	.005	600	23004	P688-005	D6-502	811-005	TM-25	Integrator Net.
C66	.005	600	23004	P688-005	D6-502	811-005	TM-25	Integrator Net.
C67	4900	500	23207	1467-005	D6-502		IFM-25	Vert. Osc. Grid Cap.
C68	.1	400	23011	P488-1			TM-1	Vert. Discharge
C69	.1	400	23013	P488-22			TC-2	Vert. Sweep Coupling
C70	82		23935	1468-0001	D2-82	GP1K-100	IFM-31	Hor. Sync. Coupling
C71	.015	400	23025	P488-015			MB-115	Fixed Trimmer
C72	4000		23947	GP4000K	D6-472	GP2M-0047	TM-24	AFC Filter
C73	.05	200	23017	P288-05			TM-15	AFC Filter
C74	.05	600	23010	P688-05			TM-15	Hor. AFC Screen Bypass
C75	.015	400	23024	P488-015			MB-115	Hor. AFC Coupling †
C76	1200		23925	CN1200MN1400		N1400-335-0012		Phase Shifter
C77	.015	400	23025	P488-015			MB-115	Phase Shifter
C78	4000		23947	GP4000K			IFM-24	Hor. Osc. Grid Cap.
C79	.05	200	23017	P288-05			TM-15	Hor. Osc. Screen Bypass
C80	390		23945	GP390K	D6-391	GP2K-390	IFM-34	Differentiator Net.
C81	.01	500	23023	P688-01	D6-103	821-01	TM-11	Hor. Sweep Coupling
C82	[illegible]		23946	GP680K	D6-681	GP2K-680	IFM-37	Hor. Discharge
C83	.001	600	23001	P688-001	D6-102	GP2L-001	TM-21	Hor. Sweep Coupling
C84	.05	600	23010	P688-05			TM-15	Hor. Output Screen Bypass
C85	.1	400	23011	P488-1			TM-1	Hor. Output Cath. Bypass
C86	.15	200	23028	P288-15				Damper Filter
C87	.05	200	23017	P288-05			TM-15	Damper Filter
C88	.25	400	23013	P488-25			TC-2	Damper Filter
C89	.01	500	23023	P688-01			TM-11	Fixed Trimmer *
C90	500	10000	23938					Voltage Doubler Cap.
C91	500	10000	23938					HV Filter
C92	500	10000	23938					HV Filter
C93	.01	125AC	23932	P688-01	D6-103	821-01	TM-11	Line Filter
C94	.01	125AC	23932	P688-01	D6-103	821-01	TM-11	Line Filter

* Not used in all models.
† When either items C50 or C51 are replaced, replace both with capacitors of equal value.
‡ Some models use .004MFD in this application.
# Parallel sections to obtain desired capacity.

CONTROLS

ITEM No	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Packard-Bell PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	REPLACEMENT DATA: CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	25022	Q13-133	M-60-Z	B-60-S	Volume control
B	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R1A per instructions
R2A	50KΩ	½	}	Bll-123 *			Brightness control, panel
B	1000Ω	½	25822A	Bll-108 *			Contrast control, rear
C	Shaft End		}	E-202 *			Attach per instructions in "Concentrikit"
R3	1 Meg.	½	25823A	Q11-137	M-61-S	B-69	Vert. hold control
R4	3 Meg.	½	25805D	Q11-140		B-84	Height control
R5	5000Ω	½	25807	Q11-114	M-19-S	B-10	Vert. linearity control
R6A	25KΩ	½	25809D	Q11-120	AM-40-S		AGC delay control
B	Shaft		Not Req.	RQ	KSS-3 #		Attach to R6A per instructions
R7	25KΩ	½	25809D	Q11-120	M-40-S		Horiz. drive control
R8	1500Ω	½	25812		10-1500		Focus control-Wire Wound
R9	20Ω	2	25817	W-20	43-20	V-110	Horiz. centering control-Wire Wound
R10	20Ω	2	25808	W-20X10	43-20CT		Vert. centering control-Wire Wound tapped at 10Ω

* Additional parts to be used with "Concentrikit".
# File slot in shaft to duplicate original.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R11	3900Ω	½		BTS-3900	RF Grid
R12	47KΩ	½			AGC Network
R13	10KΩ	½			RF Plate Coil Shunt
R14	2200Ω	½		BTS-2200	RF Decoupling
R15	4700Ω	½			Conv. Grid
R16	220KΩ	½			Conv. Grid
R17	15KΩ	½			Conv. Plate
R18	10KΩ	½			Osc. Grid
R19	4700Ω	½			Osc. Plate
R20	1000Ω	½	73025	BTS-1000	Decoupling
R21	8200Ω	½	73036		1st Video IF Grid
R22	82Ω	½	73012		1st Video IF Cathode
R23	100Ω	½	73013		1st Video IF Decoupling
R24	120Ω	½	73014		AGC Network
R25	120Ω	½	73014		AGC Network
R26	8200Ω	½	73036		2nd Video IF Grid
R27	82Ω	½	73012		2nd Video IF Cathode
R28	100Ω	½	73013		2nd Video IF Decoupling
R29	4700Ω	½	73033	BTS-4700	3rd Video IF Grid
R30	82Ω	½	73012		3rd Video IF Cathode
R31	100Ω	½	73013		3rd Video IF Decoupling
R32	120Ω	½	73014		AGC Network
R33	180Ω	½	73016		4th Video IF Cathode
R34	100Ω	½	73013		4th Video IF Decoupling
R35	2.2 Meg. 20%	½	73165	BTS-2.2 Meg.	AGC Network
R36	2.2 Meg. 20%	½	73165	BTS-2.2 Meg.	AGC Network-See Note 2
R37	4700Ω	½	73033	BTS-4700	5th Video IF Coil Shunt
R38	3900Ω	½	73032	BTS-3900	Video Det. Diode Load
R39	470KΩ 20%	½	73157	BTS-470K	Video Amp. Grid
R40	3300Ω	½	73031	BTS-3300	Video Amp. Plate
R41	6800Ω	½	73035	BTS-6800	Low Pass Filter
R42	1 Meg. 20%	½	73161	BTS-1 Meg.	Bias Network
R43	680KΩ 20%	½	73159	BTS-680K	Video Output Grid
R44	330Ω	½	73019	BW-½-330	Video Output Cathode
R45	3300Ω	1	73031	BTA-3300	Video Output Plate
R46	10KΩ	½	73037	BTS-10K	Isolation
R47	470KΩ 20%	½	73157	BTS-470K	DC Rest. Load
R48	470KΩ 20 %	½	73157	BTS-470K	DC Rest. Load
R49	100KΩ 20%	½	73149	BTS-100K	Picture Tube Grid
R50	47KΩ	½	7345	BTS-47K	Voltage Divider
R51	150KΩ 20%	½	73151	BTS-150K	Voltage Divider
R52	220KΩ 20%	½	73153	BTS-220K	AGC Amp. Grid

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
R53	220KΩ 20%	½	73153	BTS-220K	AGC Amp. Plate Load
R54	10KΩ	½	73037	BTS-10K	Voltage Divider
R55	220KΩ 20%	½	73153	BTS-220K	Voltage Divider
R56	82Ω	½	73012		1st Sound IF Cathode
R57	1000Ω	½	73025	BTS-1000	1st Sound IF Decoupling
R58	120Ω	½	73014		2nd Sound IF Cathode
R59	1000Ω	½	73025	BTS-1000	2nd Sound IF Decoupling
R60	470Ω	½	73021	BTS-470	Balancing
R61	10KΩ	½	73037	BTS-10K	Ratio Det. Diode Load
R62	10KΩ	½	73037	BTS-10K	Ratio Det. Diode Load
R63	22KΩ	½	73041	BTS-22K	De-emphasis
R64	4.7Meg. 20%	½	73169	BTS-4.7 Meg.	AF Amp. Grid
R65	39Ω	½	73008	BW-½-39	AF Amp. Cathode
R66	2.2 Meg. 20%	½	73165	BTS-2.2 Meg.	AF Amp. Screen
R67	470KΩ 20%	½	73157	BTS-470K	AF Amp. Plate
R68	2200Ω	½	73029	BTS-2200	AF Feedback
R69	470KΩ 20%	½	73157	BTS-470K	Output Grid
R70	270Ω	1	73218	BW-1-270	Output Cathode
R71	1000Ω	2	73425	BT-2-1000	Decoupling
R72	4.7 Meg. 20%	½	73169	BTS-4.7 Meg.	Bias Network
R73	680KΩ 20%	½	73159	BTS-680K	1st Sync. Amp. Grid
R74	4700Ω	1	73233	BTA-4700	1st Sync. Amp. Plate
R75	4700Ω	1	73233	BTA-4700	1st Sync. Amp. Plate Decoupling
R76	1 Meg. 20%	½	73161	BTS-1 Meg.	Sync. Sep. Grid
R77	4.7 Meg. 20%	½	73169	BTS-4.7 Meg.	Bias Network
R78	6800Ω	½	73035	BTS-6800	Sync. Sep. Plate
R79	1 Meg. 20%	½	73161	BTS-1 Meg.	2nd Sync. Amp. Grid
R80	4700Ω	½	73033	BTS-4700	2nd Sync. Amp. Plate
R81	1000Ω	½	73025	BTS-1000	Decoupling
R82	22KΩ	½	73041	BTS-22K	Voltage Divider
R83	22KΩ	½	73041	BTS-22K	Integrator Network
R84	8200Ω	½	73036	BTS-8200	Integrator Network
R85	8200Ω	½	73036	BTS-8200	Integrator Network
R86	1 Meg. 20%	½	73061	BTS-1 Meg.	Vert. Osc. Grid
R87	1 Meg. 20%	½	73061	BTS-1 Meg.	Vert. Osc. Plate
R88	6.8 Meg.	½	73171	BTS-6.8 Meg.	Voltage Divider
R89	100KΩ 20%	½	73149	BTS-100K	Voltage Divider
R90	100Ω	1	73013	BW-½-100	Vert. Amp. Cathode
R91	2.2 Meg. 20%	½	73165	BTS-2.2 Meg.	Vert. Amp. Grid
R92	3300Ω	1	73031	BTS-3300	Vert. Peaking
R93	1 Meg. 20%	½	73161	BTS-1 Meg.	Horiz. Phase Det. Load
R94	470KΩ 20%	½	73157	BTS-470K	Horiz. Phase Det. Load
R95	470KΩ 20%	½	73157	BTS-470K	Horiz. Phase Det. Load
R96	470KΩ 20%	½	73157	BTS-470K	Horiz. AFC Filter Network
R97	560Ω	½	73022	BTS-560	Horiz. AFC Grid
R98	10Ω	½	73001		Horiz. AFC Cathode
R99	22KΩ	1	73241	BTA-22K	Horiz. AFC Plate
R100	39KΩ	1	73244	BTA-39K	Horiz. AFC Screen
R101	27KΩ	1	73042	BTS-27K	Voltage Divider
R102	68KΩ 20%	½	73147	BTS-68K	Horiz. Osc. Grid
R103	5000Ω	10	73639	AB-5000	Horiz. Osc. Plate-Wire Wound
R104	10KΩ	1	73237	BTA-10K	Horiz. Osc. Screen
R105	6800Ω	½	73035	BTS-6800	Differentiator
R106	220KΩ 20%	½	73153	BTS-220K	Horiz. Discharge Grid
R107	270KΩ	½	73054	BTS-270K	Horiz. Discharge Plate
R108	47Ω	½	73009		Parasitic Supp.
R109	220KΩ	½	73153	BTS-220K	Horiz. Output Grid-See Note 1
R110	100Ω	2	73413	BW-2-100	Horiz. Output Cathode -Wire Wound
R111	18KΩ	6	73644	AB-18, 000	Horiz. Output Screen -Wire Wound
R112	56KΩ	½	73046	BTS-56K	Filter
R113	220Ω	1	73217	BW-1-220	Horiz. Linearity Network
R114	3.3Ω	1	73279		HV Rect. Filament
R115	3.3Ω	1	73279		HV Rect. Filament
R116	470KΩ 20%	½	73157		HV Filter
R117	1 Meg.	1	73261		HV Rect. Load
R118	1 Meg.	1	73261		HV Rect. Load
R119	10KΩ	½	73037	BTS-10K	Acc. Anode Load
R120	390KΩ	½		BTS-390K	Line Filter
R121	10Ω	½	73001		Surge Limiter
R122	10Ω	½	73001		Surge Limiter
R123	100Ω	20	73809		Surge Limiter-Wire Wound
R124	270Ω	2	73418	BW-2-270	Focus Coil Shunt
R125	2000Ω	10	73633	AB-2000	Bias Network
R126A	250Ω	20	73661		Bias Network-Wire Wound
B	1360Ω	25			Filter-Wire Wound
R127A	6750Ω	5	}		Bleeder-Wire Wound
B	12Ω	1	73664		Bias Network-Wire Wound
C	93Ω	5			Bias Network-Wire Wound

Note 1. Some models use 390KΩ resistor in this application.
Note 2. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: MERIT PART No.	REPLACEMENT DATA: CHICAGO PART No.
T1	117VAC @ 2.44A	780VCT .320ADC	5VAC @ 6A	6.3VAC @ 1.2A SEC. 4 12.6VCT @ 5A	89033		P-3174 ②	

② Drill new mounting holes.
Parallel 2-5V taps for 6A
Series 2-6.3V taps for 12.6VCT

SPEAKER

ITEM No.	RATINGS: FIELD RES.	RATINGS: V. C. IMP.	REPLACEMENT DATA: PACKARD-BELL PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	NOTES
SP1	450Ω	8Ω	83801		12E450S	
	CONE DIA.	V. C. DIA.				
SP2	11 1/2"	1 3/4"				

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	REPLACEMENT DATA PACKARD-BELL PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	NOTES
T2	230Ω	1350Ω	89031	A-8111 ①	A-3000 ①	TBO-1 ①	Vert. Block Osc. Trans
T3	130Ω	14Ω Tap	89424	A-8119	HVO-5	TFB-4	Hor. Output Trans.
	Tap ⓐ	ⓐ 1.2Ω					
	105Ω	SEC. 2					
		0Ω					
		SEC. 3					
		0Ω					
T4	920Ω	12Ω	89422	A-8112	A-3036	TSO-5	Vert. Output Trans.
T5A	13Ω		29501	DY-1	MD-3		Hor. Deflection Coil
B	62Ω						Vert. Deflection Coil
T6	435Ω		29519		MF-2		Focus Coil

① Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA PACKARD-BELL PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
T7	5.3KΩ	8Ω	570Ω	1.4Ω	89425	A-3824	A-2904 ①	RO-9	① Drill one new mounting hole.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA Packard-Bell PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA MERIT PART No.	REPLACEMENT DATA CHICAGO PART No.	INSTALLATION NOTES
L1	.320A	37Ω	1 Henry		C-2326	C-2996	TR-3300	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PACKARD-BELL PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L2	Antenna Coil					
L3	Fil. Choke	0Ω				
L4	RF Mixer Grid & Osc.					
L5	Fil. Choke	0Ω				
L6	1st Video IF					
L7	RF Choke					
L8	RF Choke	1Ω				Wound on 3300Ω resistor.
L9	2nd Video IF	.2Ω		29028		
L10	3rd Video IF-Sound Take Off	.1Ω	0Ω	29047		
L11	RF Plate	6.7Ω		29115		
L12	4th Video IF	.2Ω		29028		
L13	Sound Trap	0Ω	0Ω	29516		
L14	RF Plate Chk.	6.5Ω		29115		
L15	5th Video IF	.3Ω		29028		
L16	Peaking	10.3Ω		29508		White identification dot. Wound on 39KΩ resistor.
L17	Peaking	11Ω		29506		Blue identification dot. -See Note 1
L18	Peaking	11Ω		29506		Blue identification dot. Wound on 22KΩ resistor.
L19	Peaking	5.5Ω		29507		Red identification dot.
L20	Peaking	8Ω		29509		Green identification dot.
L21	Peaking	5.5Ω		29507		Red identification dot.
L22	Sound IF	.1Ω	.1Ω	29025		
L23	Ratio Det. Trans.	.1Ω	0Ω	29031		
L24	Horiz. Disc. Trans.	47Ω	42Ω	29030		
L25	Horiz. Lin.	8.5Ω		29517		

Note 1. In some sets this part may be a 250 microhenries coil wound on a plain form.

SELENIUM RECTIFIER

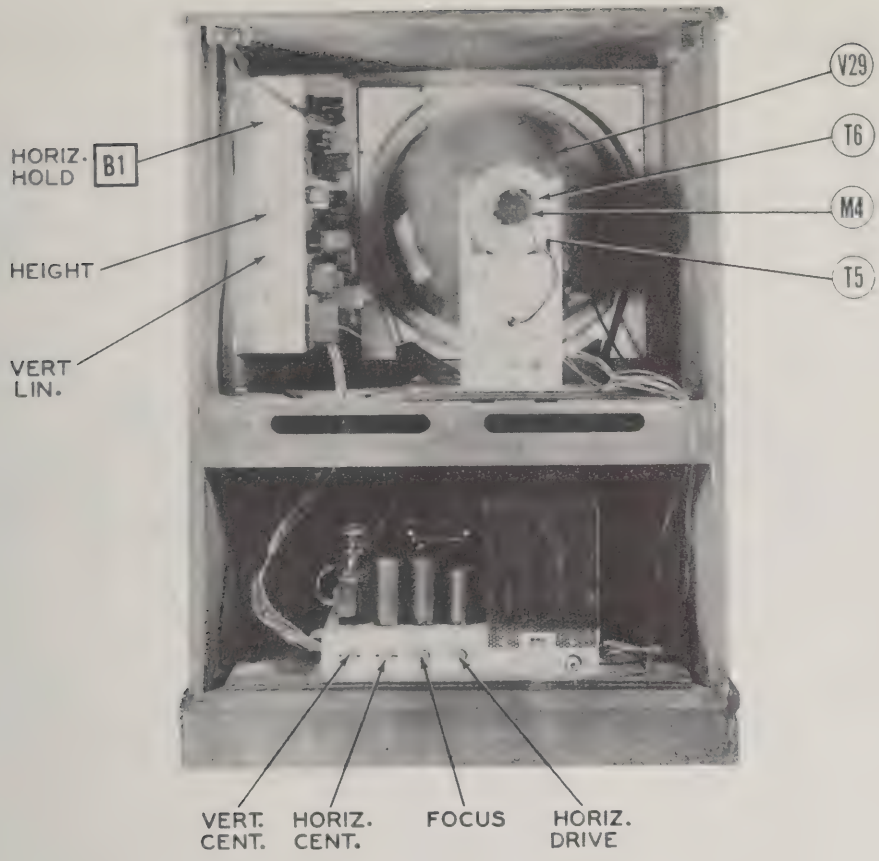
ITEM No.	RATING CURRENT	REPLACEMENT DATA PACKARD-BELL PART No.	REPLACEMENT DATA SYLVANIA PART No.		NOTES
M1	.140A	72003	NE-5		

DIAL LIGHTS

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PACKARD-BELL PART No.		NOTES
M2	Bayonet	6-8	.25	Blue	54002		Type #44

MISCELLANEOUS

ITEM No.	PART NAME	PACKARD-BELL PART No.	NOTES
M3	RF Tuner	10528	
M4	Ion Trap		
M5	Fuse	45003	3AG .25A
	Cabinet	21084	
	Knob	52053	Selector
	Knob	52054	Fine Tuning
	Knob	52055	Volume and Vertical
	Knob	52056	Contrast
	Knob	52057	Brightness



CABINET-REAR VIEW

HORIZONTAL OSCILLATOR ADJUSTMENT

Turn the set on and tune in a TV station, preferably a test pattern.

Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.

If the horizontal blanking bar appears as a vertical line in the raster, turn the horizontal phasing slug (B2) until the bars moves to the right and off the raster. If ripples occur in the raster adjust B2 until the unstable condition disappears.

HORIZONTAL LINEARITY ADJUSTMENT

Turn the horizontal drive control clockwise as far as possible without crowding the right side of the picture.

Adjust the horizontal linearity slug (B3) and the horizontal drive control alternately until picture is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove fifteen phillips head screws holding rear cover. Remove cover.
3. Remove Video output plug.
4. Remove two plugs from power supply chassis.
5. Remove picture tube HV cap.
6. Remove four screws holding picture tube mounting. Remove picture tube mounting with picture tube.
7. Remove Jones plug from TV chassis.
8. Disconnect built-in antenna leads.
9. Remove two screws holding antenna terminal strip.
10. Remove four screws holding TV chassis. Slide chassis to rear and remove.
11. Remove cabinet lamp assembly from bracket. (Bottom front center)
12. Remove screw holding speaker plug in socket.
13. Remove speaker plug.
14. Remove four screws holding power chassis. Remove power chassis.
15. Remove four screws holding speaker. Remove speaker.

PHOTOFACT* Folder

PHILCO MODEL
50-T1443 (CODES 122, 123)

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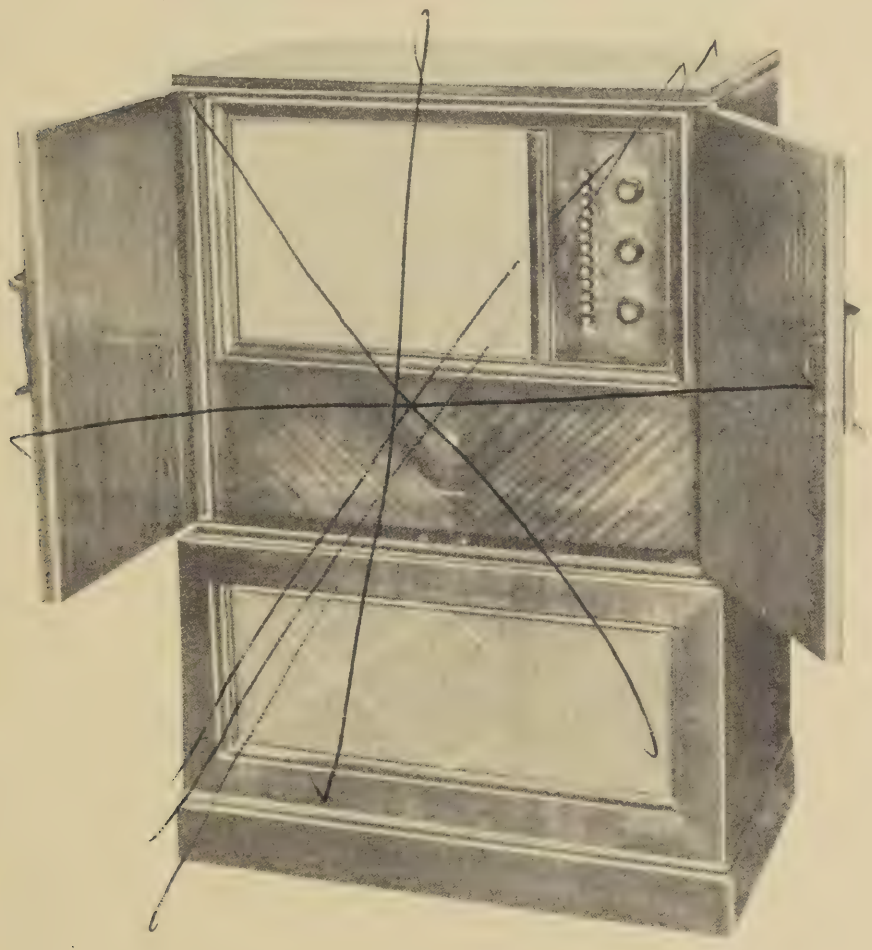

PHILCO MODEL
50-T1443 (CODES 122, 123)

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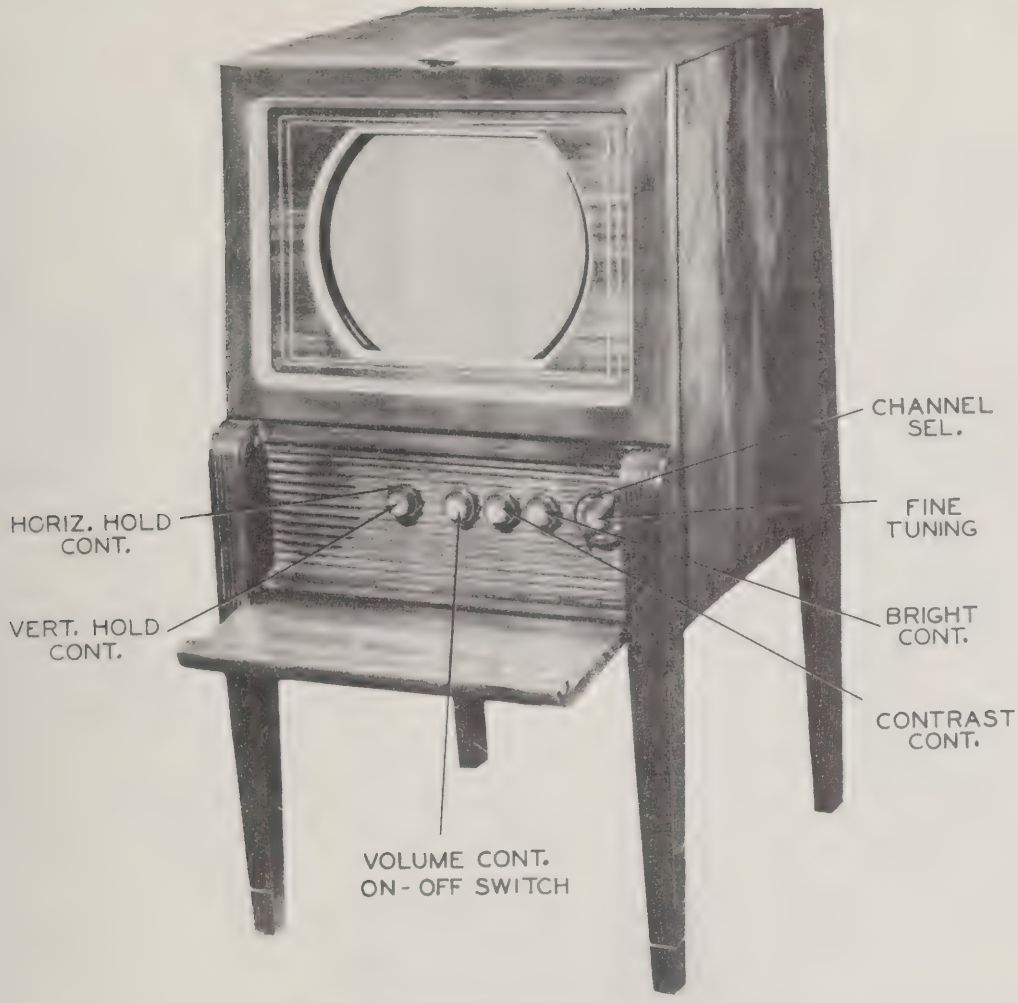

PHILCO
MODEL 50-T1443 (CODES 122, 123)

PHILCO MODEL 50-T1443 (Code 123)

TRADE NAME	Philco Model 50-T1443 (Codes 122, 123)
MANUFACTURER	Philco Corp., Tioga and "C" Sts., Philadelphia, Pa.
TYPE SET	Television Receiver
TUBES	Twenty Six
POWER SUPPLY	110-120 Volts AC-60 Cycle
RATING	2 Amp. @ 117 Volts AC
TUNING RANGE—Channels 2 thru 13	

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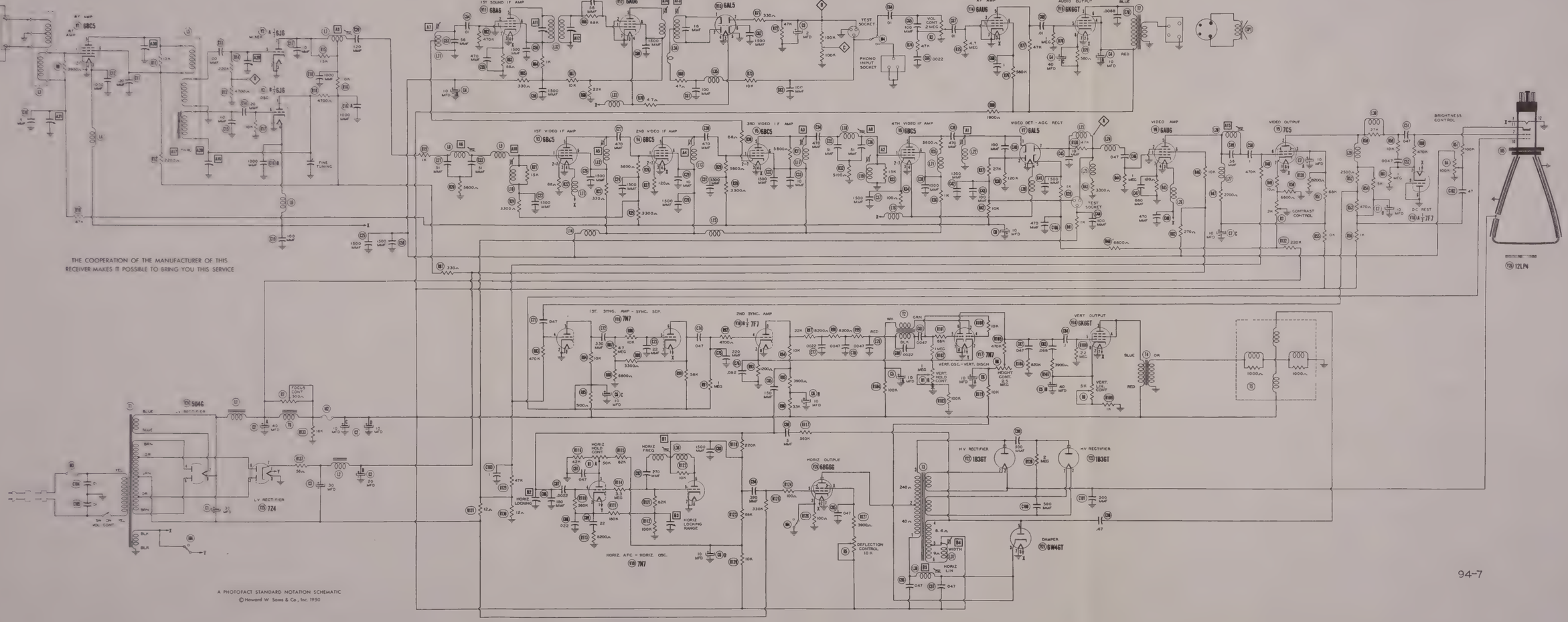
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
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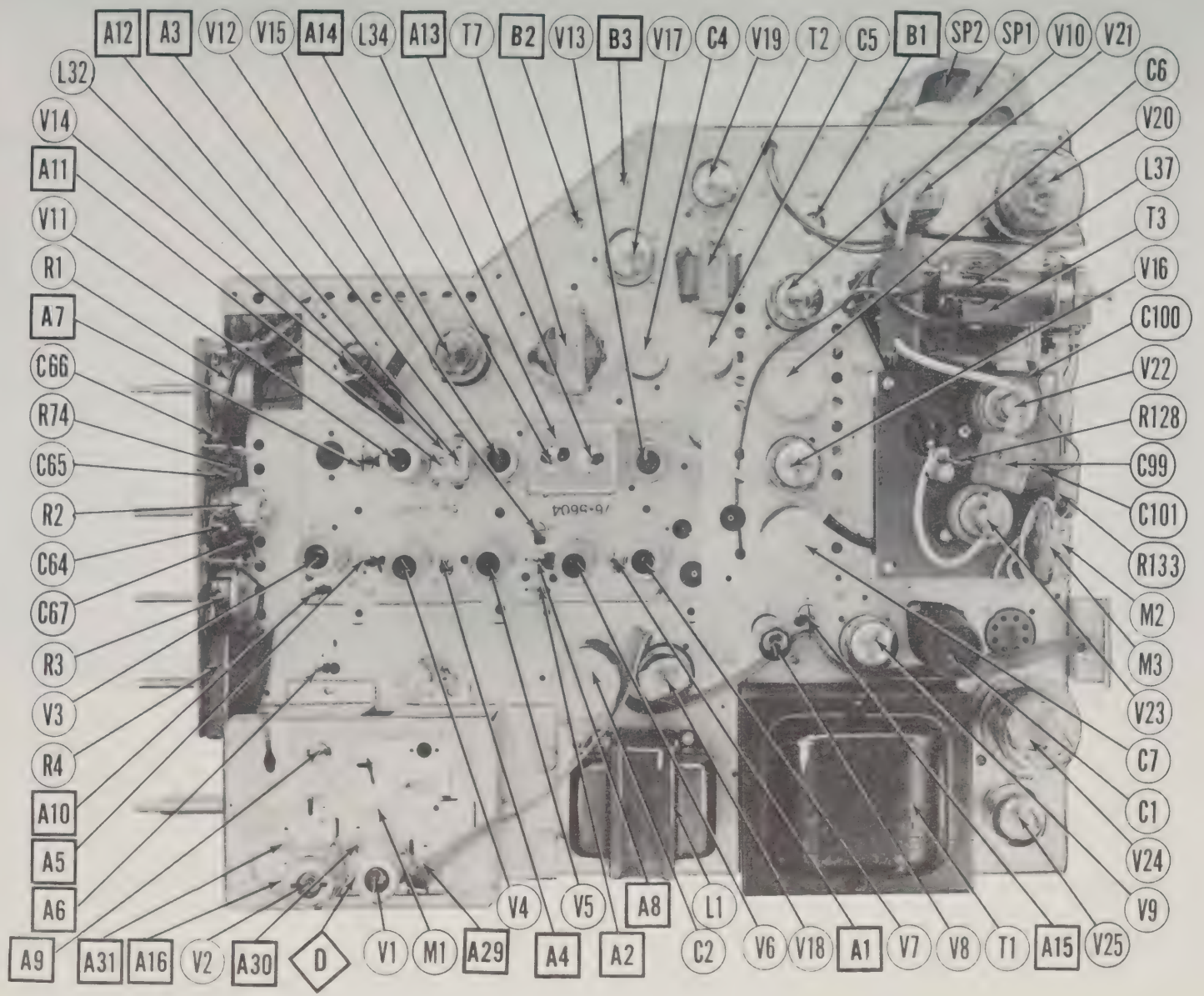
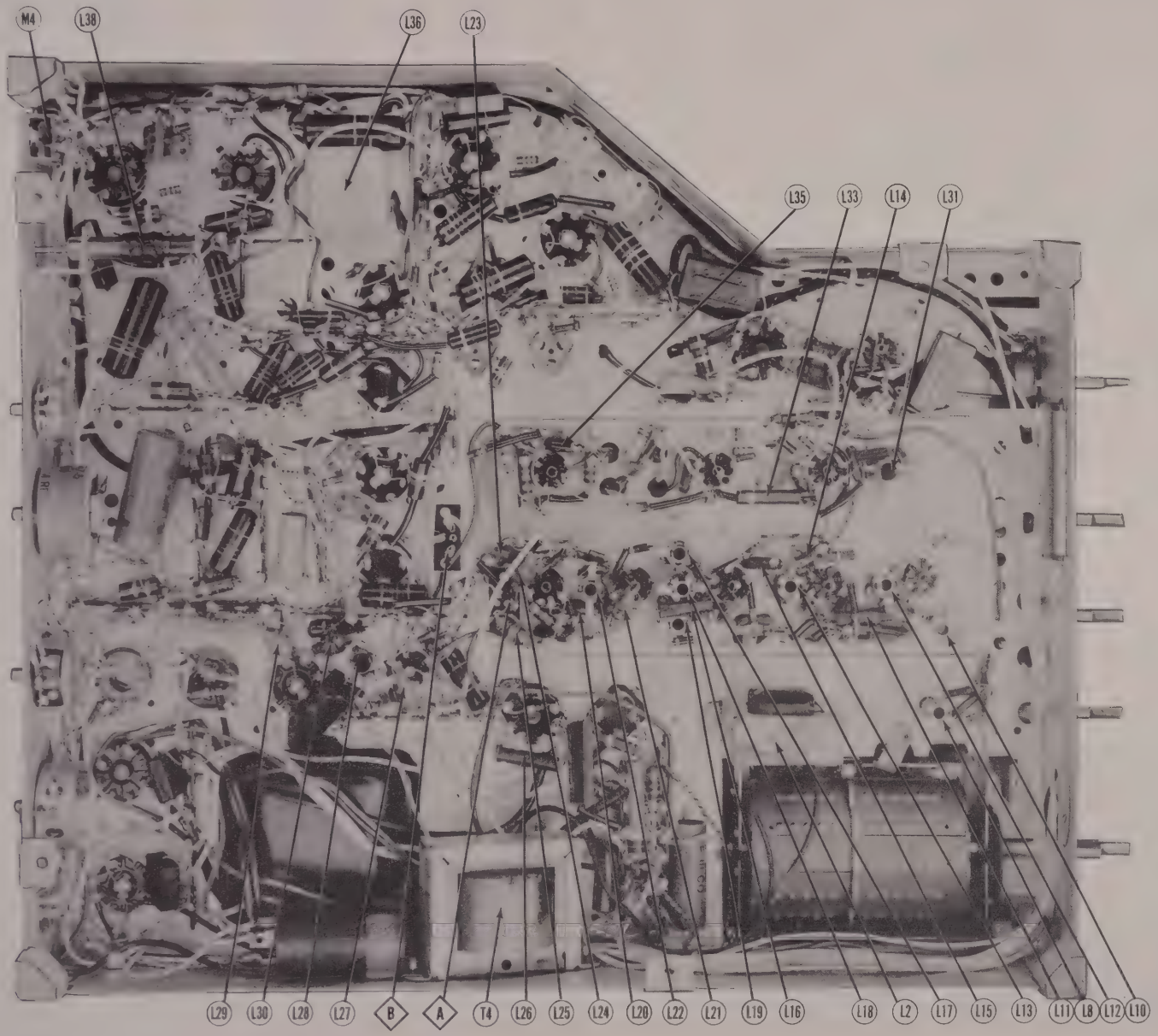
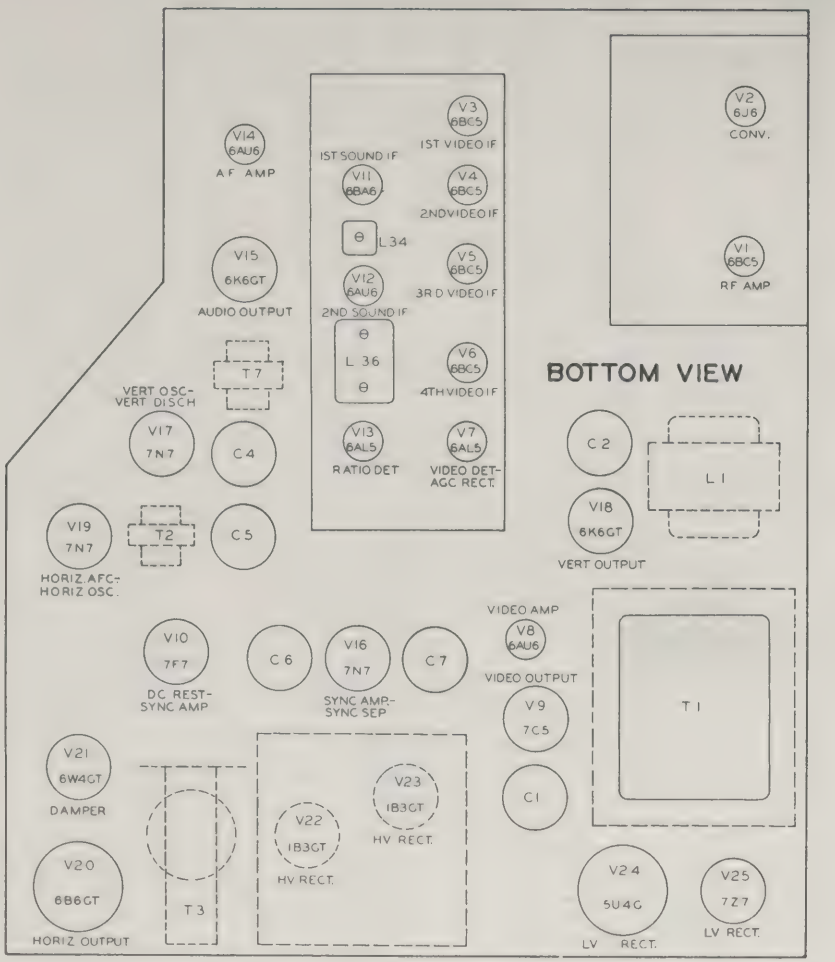
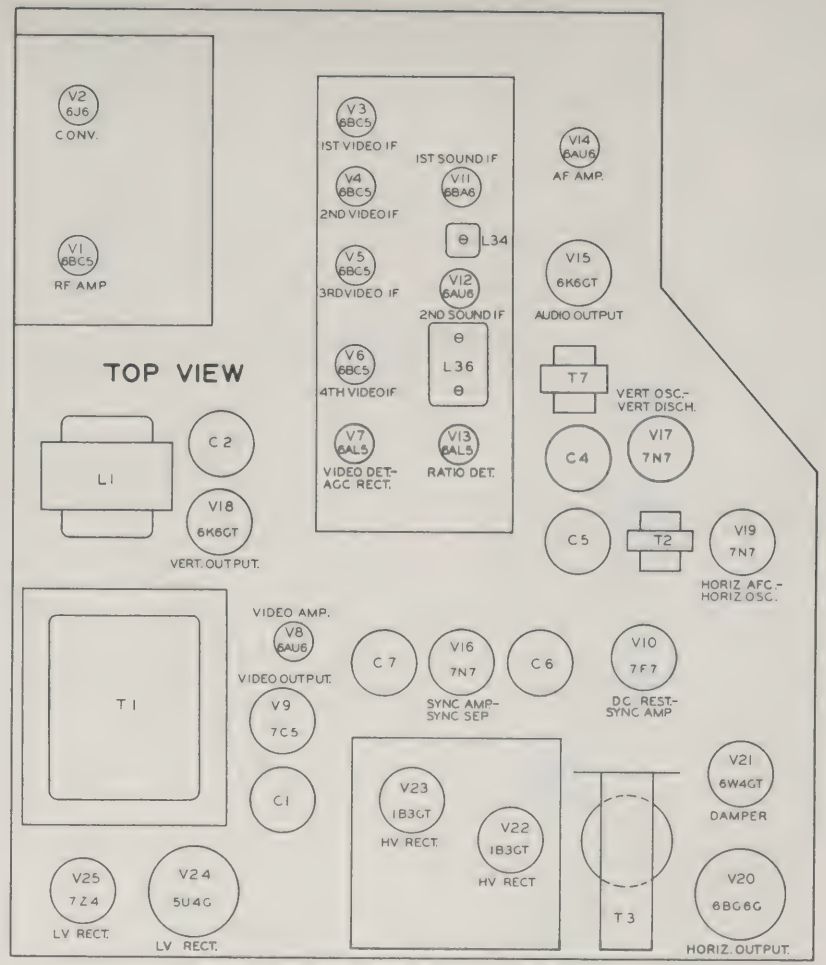


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To eliminate the high voltage shock hazard remove the horizontal oscillator tube (V19) from its socket and disconnect the lead connected between pin 3 of the horizontal output tube (V20) and the **TELEVISION-PHONO** switch. This will place the 100Ω resistor (R126) in the cathode circuit to provide bias for V20 and reduce the place current to normal.

Do not attempt to operate the set without the focus and deflection coils connected.

Pre-set the following adjustments:

A10 fully counter-clockwise.

A11 and A12 fully clockwise.

A8, A3, and A7 until the top of the screws are approximately 5/8 inch from the top of the coil mount.

VIDEO IF ALIGNMENT

Remove the convertor tube (V2). If V2 is a 6J6 replace it with a 6J6 which has pin 1 removed, if V2 is a 7F8 replace it with a 7F8 which has pin 6 removed. This will disable the local oscillator and prevent erroneous indications.

During video IF alignment attenuate signal generator to maintain 2 volt deflection on VTVM.

Turn the contrast control to maximum counter-clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to pin 1 (Grid) of 6AG5 (V6). Low side to chassis.	25.5MC (Unmod.)	Any	DC Probe to Point ◇A◇ Common to chassis.	A1	Adjust for maximum deflection. Use the peak with the slug farthest out.
2.	.01MFD	High side to pin 1 (Grid) of 6AG5 (V5). Low side to chassis.	24.5MC (Unmod.)	"	"	A2	"
3.	.01MFD	"	25MC (Unmod.)	"	"	A3	"
4.	.01MFD	High side to pin 1 (Grid) of 6AG5 (V4). Low side to chassis.	26.6MC (Unmod.)	"	"	A4	"
5.	.01MFD	High side to pin 1 (Grid) of 6AG5 (V3). Low side to chassis.	23.25MC (Unmod.)	"	"	A5	"
6.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	28.1MC (Unmod.)	"	"	A6	Adjust for **MINIMUM** deflection.
7.	Direct	"	22.1MC (Unmod.)	"	"	A7, A8	Adjust A7 for **MINIMUM** deflection. If no dip can be found adjust A7 counter-clockwise until a sharp increase is noted, then clockwise to the point just before the increase began. Then adjust A8 for minimum deflection.
8.	Direct	"	24.25MC (Unmod.)	"	"	A9	Adjust for maximum deflection.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope ofor horizontal deflection.
Connect a 10KΩ resistor in series with the oscilloscope vertical input.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	25MC (10MC SWP)	23.25MC 23.5MC 25.75MC 26.6MC	Any	Vert. Amp. to Point ◇A◇ Low side to chassis.	A10	Adjust A10 for response curve within the limits shown in Fig 1. If necessary retouch A1, A2, A3, A4, A5, A9 and A10 for proper response.

SOUND IF ALIGNMENT

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
Attenuate the sweep generator to maintain .5 volt peak to peak indication.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	22.1MC (1MC SWP)	22.1MC (400 ∿ AM Mod.)	Any	Vert. Amp. to Point ◇B◇ Low side to chassis.	A11, A12	Adjust A11 and A12 slightly clockwise until an indication is observed on the scope.
11.	Direct	"	"	"	"	"	A13, A14	Adjust A13 for minimum AM indication. Adjust A14 for symmetrical "S" curve similar to Fig 2.
12.	Direct	"	"	22.1MC (Unmod.)	"	"	A11, A12	Adjust for maximum amplitude and symmetry of pattern.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	.01MFD	High side to Point A. Low side to chassis.	Not used	4.5MC (400 ∿ AM Mod.)	Any	Vert. Amp. to pin 2 of picture tube.	A15	Adjust for minimum 400 ∿ indication on scope.

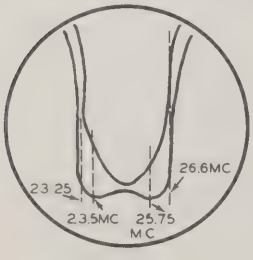


FIG. 1

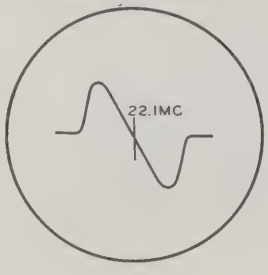


FIG. 2

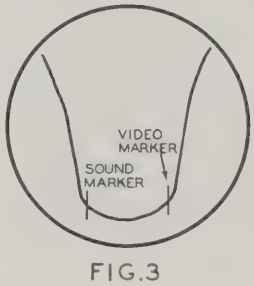


FIG. 3

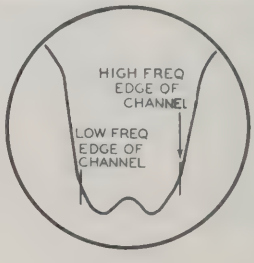


FIG. 4

OSCILLATOR ALIGNMENT (TUNER 76-5411-3)

Connect two matched 100KΩ (± 1%) resistors in series from point A to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

Complete oscillator alignment may not be necessary.

If the oscillator seem to be off frequency approximately the same amount for a majority of the channels, it may be possible to correct them in one step using A16.

It should be noted that this is an all channel oscillator circuit adjustment and should not be adjusted for any individual channel. If adjustment of A16 will not bring all channels within the range of the fine tuning control, it will be necessary to adjust the individual channel oscillator adjustment for each channel that is off frequency. The individual channel oscillator adjustment screws are reached thru a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.

Remove the dummy converter tube and replace the original tube.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
14.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	215.75MC (Unmod.)	13	DC Probe to Point (B) Common to Point (C)	A17	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
			209.75MC (Unmod.)	12		A18	
			203.75MC (Unmod.)	11		A19	
			197.75MC (Unmod.)	10		A20	
			191.75MC (Unmod.)	9		A21	
			185.75MC (Unmod.)	8		A22	
			179.75MC (Unmod.)	7		A23	
			87.75MC (Unmod.)	6		A24	
			81.75MC (Unmod.)	5		A25	
			71.75MC (Unmod.)	4		A26	
			65.75MC (Unmod.)	3		A27	
			59.75MC (Unmod.)	2		A28	

RF ALIGNMENT (TUNER 76-5411-3)

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	207MC (10MC SWP)	205.25MC 209.75MC	12	Vert. Amp. to Point (D) Low side to chassis.	A29, A30, A31	Adjust for response curve similar to Fig 3 with markers above 90%. Check all channels for response similar to Fig 3. If markers fall below 70% on any channel, make slight adjustment of A29, A30 and A31 with channel switch set for that channel. Recheck all channels to see that they have not been seriously effected.
			213MC (10MC SWP)	211.25MC 215.75MC	13			
			201MC (10MC SWP)	199.25MC 203.75MC	11			
			195MC (10MC SWP)	193.25MC 197.75MC	10			
			189MC (10MC SWP)	187.25MC 191.75MC	9			
			183MC (10MC SWP)	181.25MC 185.75MC	8			
			177MC (10MC SWP)	175.25MC 179.75MC	7			
			85MC (10MC SWP)	83.25MC 87.75MC	6			
			79MC (10MC SWP)	77.25MC 81.75MC	5			
			69MC (10MC SWP)	67.25MC 71.75MC	4			
			63MC (10MC SWP)	61.25MC 65.75MC	3			
			57MC (10MC SWP)	55.25MC 59.75MC	2			

OSCILLATOR ALIGNMENT (TUNER 76-4402-5)

Remove the dummy converter tube and replace the original tube.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
16.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	59.75MC (Unmod)	2	DC Probe to point (B) Common to chassis.	A32	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
			65.75MC (Unmod)	3		A33	
			71.75MC (Unmod.)	4		A34	
			81.75MC (Unmod)	5		A35	
			87.75MC (Unmod)	6		A36	
			179.75MC (Unmod)	7		A37	
			185.75MC (Unmod)	8		A38	
			191.75MC (Unmod)	9		A39	
			197.75MC (Unmod)	10		A40	
			203.75MC (Unmod)	11		A41	
			209.75MC (Unmod.)	12		A42	
			215.75MC (Unmod.)	13		A43	

RF ALIGNMENT (TUNER 76-4402-5)

Push a piece of solder into the hole adjacent to A9 so that the terminal under the hole is shorted to chassis.

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω carbon res.	Across antenna terminals with 120Ω in each lead.	57MC (10MC SWP)	54MC 60MC	2	Vert. Amp. to Point (E) Low side to chassis.	A44	Adjust for response curve similar to Fig 4 with markers at 70%.
18.	"	"	85MC (10MC SWP)	82MC 88MC	6	"	A45	Adjust for maximum amplitude and symmetry.
19.	"	"	213MC (10MC SWP)	210MC 216MC	13	"	A46, A47	"

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	-.4VDC	0V.	6.3VAC	0V.	165VDC	165VDC	0V.		
V 2	6J6	95VDC	120VDC	0V.	6.3VAC	-1.6VDC	§-6.8VDC	0V.		
V 3	6BC5	-2.5VDC	.6VDC	0V.	6.3VAC	150VDC	150VDC	.6VDC		
V 4	6BC5	-2.1VDC	.9VDC	0V.	6.3VAC	150VDC	150VDC	.9VDC		
V 5	6BC5	-.4VDC	.4VDC	0V.	6.3VAC	150VDC	150VDC	.4VDC		
V 6	6BC5	0V.	1.2VDC	0V.	6.3VAC	100VDC	140VDC	1.2VDC		
V 7	6AL5	0V.	-2.8VDC	0V.	6.3VAC	.1VDC	0V.	-1.5VDC		
V 8	6AU6	0V.	0V.	6.3VAC	0V.	250VDC	140VDC	1 VDC		
V 9	7C5	0V.	340VDC	125VDC	-3VDC	0V.	-1VDC	9VDC	6.3VAC	
V 10	7F7	6.3VAC	5.4VDC	160VDC	5.4VDC	0V.	0V.	1.2VDC	0V.	
V 11	6BA6	0V.	0V.	0V.	6.3VAC	120VDC	120VDC	1.3VDC		
V 12	6AU6	-.4VDC	0V:	0V.	6.3VAC	65VDC	65VDC	0V.		
V 13	6AL5	-4.2VDC	-.3VDC	6.3VAC	0V.	0V.	0V.	-2.9VDC		
V 14	6AU6	-.4VDC	0V.	0V.	6.3VAC	220VDC	44VDC	0V.		
V 15	6K6GT	0V.	6.3VAC	275VDC	295VDC	0V.	295VDC	0V.	20VDC	
V 16	7N7	6.3VAC	0V.	160VDC	-1VDC	-.7VDC	33VDC	0V.	0V.	
V 17	7N7	6.3VAC	5.4VDC	340VDC	-75VDC	-75VDC	80VDC 260VDC	0V.	0V.	
V 18	6K6GT	6.3VAC	0V.	340VDC	340VDC	0V.	6.3VAC	6.3VAC	24VDC 51VDC	
V 19	7N7	6.3VAC	-12VDC	44VDC	-9VDC	-55VDC	155VDC	0V.	0V.	
V 20	6BG6G	0V.	6.3VAC	0V.	-20VDC	-20VDC	335VDC	0V.	240VDC 280VDC	TOP CAP *
V 21	6W4GT	0V.	0V.	430VDC	0V.	360VDC	0V.	0V.	6.3VAC	
V 22	1B3GT	* DO NOT MEASURE.								
V 23	1B3GT	* DO NOT MEASURE.								
V 24	5U4G	0V.	390VDC	0V.	330VAC	0V.	330VAC	0V.	390VDC	
V 25	7Z4	6.3VAC	0V.	210VAC	0V.	0V.	210VAC	200VDC	0V.	
V 26	12LP4	6.3VAC	.4VDC	PIN 10 275VDC	PIN 11 145VDC	PIN 12 0V.				

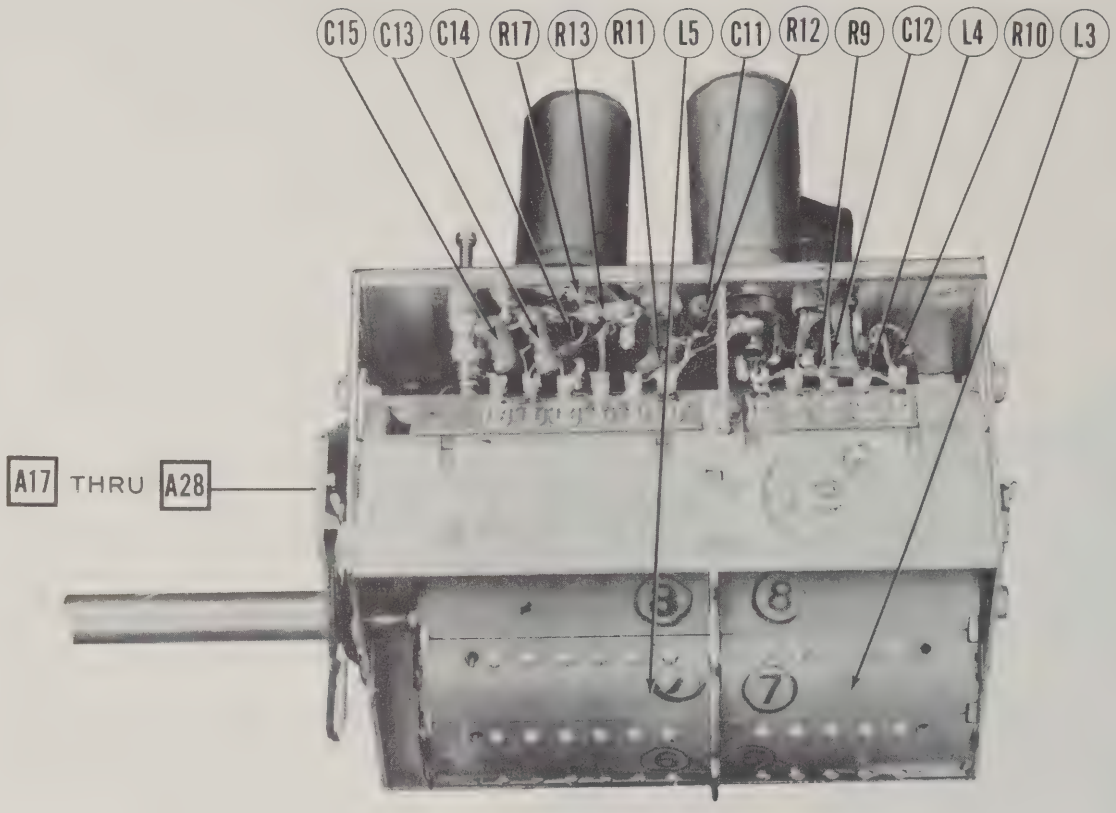
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE.

RESISTANCE READINGS

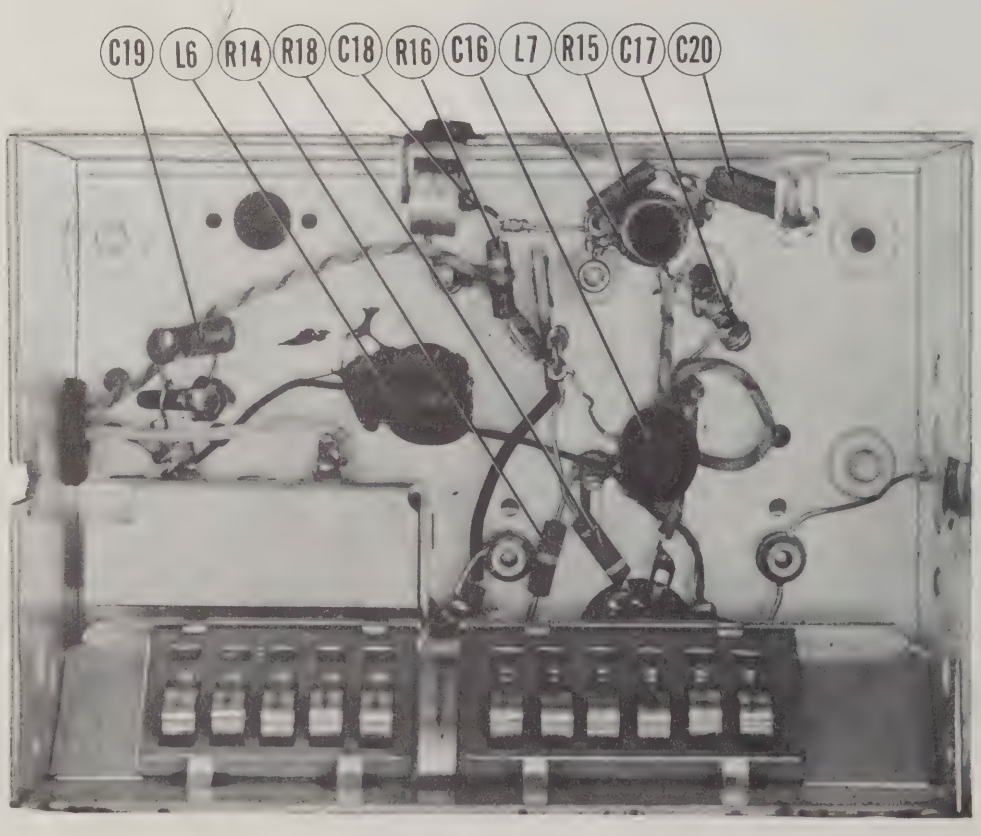
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	200KΩ	0Ω	.1Ω	0Ω	†2.6KΩ	†2.6KΩ	0Ω		
V 2	6J6	†5KΩ	†10KΩ	0Ω	.1Ω	225KΩ	10KΩ	0Ω		
V 3	6BC5	160KΩ	68Ω	0Ω	.1Ω	†825Ω	†825Ω	68Ω		
V 4	6BC5	165KΩ	120Ω	0Ω	.1Ω	†480Ω	†480Ω	120Ω		
V 5	6BC5	165KΩ	68Ω	0Ω	.1Ω	†480Ω	†480Ω	68Ω		
V 6	6BC5	.2Ω	100Ω	0Ω	.1Ω	†7KΩ	†1.5KΩ	100Ω		
V 7	6AL5	.2Ω	120KΩ	0Ω	.1Ω	8KΩ	Inf.	3300Ω		
V 8	6AU6	1 Meg.	0Ω	.1Ω	0Ω	#13KΩ	†10KΩ	120Ω		
V 9	7C5	0Ω	#3.5KΩ	#20KΩ	38KΩ	Inf.	580KΩ	155Ω	.1Ω	
V 10	7F7	.1Ω	1200Ω	#47KΩ	1 Meg.	0Ω	0Ω	1 Meg.	0Ω	
V 11	6BA6	470KΩ	0Ω	0Ω	.1Ω	†1.8KΩ	†1.8KΩ	68Ω		
V 12	6AU6	68KΩ	0Ω	0Ω	.1Ω	†11KΩ	†11KΩ	0Ω		
V 13	6AL5	Inf.	Inf.	.1Ω	0Ω	0Ω	Inf.	46KΩ		
V 14	6AU6	4.7 Meg.	0Ω	0Ω	.1Ω	#49KΩ	#560KΩ	0Ω		
V 15	6K6GT	Inf.	.1Ω	#2.6KΩ	#2.1KΩ	1 Meg.	#2.1KΩ	0Ω	560Ω	
V 16	7N7	.1Ω	0Ω	#15.4KΩ	560KΩ	4.7 Meg.	#18KΩ	0Ω	0Ω	
V 17	7N7	.1Ω	1.2KΩ	#100KΩ	2 Meg.	2 Meg.	▲ 500KΩ ▲ 3 Meg.	0Ω	0Ω	
V 18	6K6GT	.1Ω	0Ω	#1.2KΩ	#1.2KΩ	2.2 Meg.	.1Ω	.1Ω	6000Ω 1000Ω	
V 19	7N7	.1Ω	290KΩ	#42KΩ	750KΩ	180KΩ	#80KΩ	0Ω	0Ω	
V 20	6BG6G	Inf.	.1Ω	0Ω	350KΩ	350KΩ	550KΩ	0Ω	#4.5KΩ #10KΩ	TOP CAP ▲110Ω
V 21	6W4GT	Inf.	Inf.	▲ 0Ω	Inf.	#330Ω	Inf.	0Ω	.1Ω	
V 22	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ▲300Ω
V 23	1B3GT	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ▲ Inf.
V 24	5U4G	Inf.	12.5KΩ	Inf.	52Ω	Inf.	52Ω	Inf.	12.5KΩ	
V 25	7Z4	.1Ω	Inf.	40Ω	Inf.	Inf.	40Ω	24KΩ	0Ω	
V 26	12LP4	.1Ω	1.5 Meg.	PIN 10 #5KΩ	PIN 11 100KΩ	PIN 12 0Ω				

ALL MEASUREMENTS TAKEN WITH TV-PHONO SWITCH IN "TV" POSITION.
† MEASURED FROM PIN 7 OF V25.
# MEASURED FROM PIN 8 OF V24.
▲ MEASURED FROM PIN 3 OF V21.

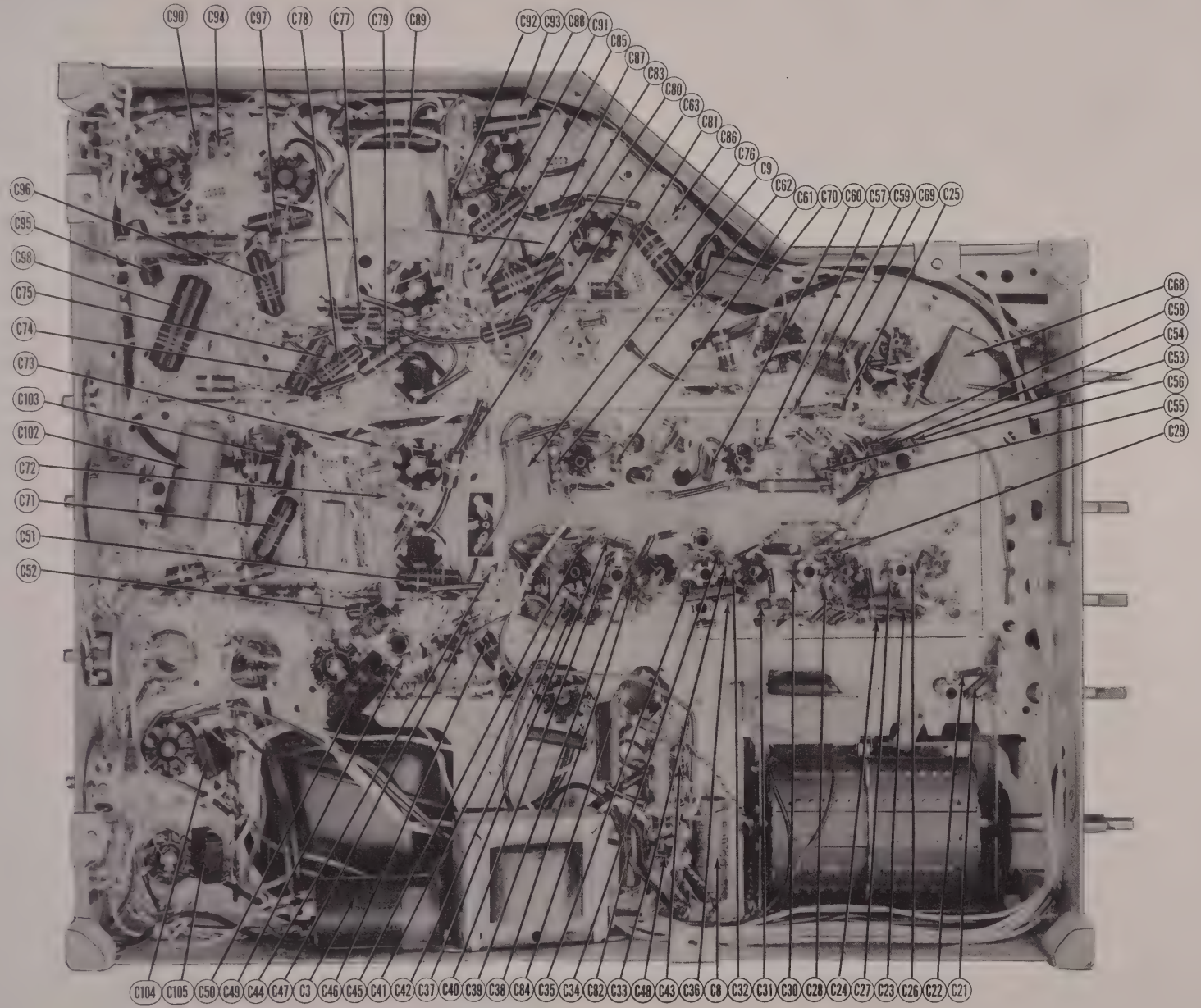
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



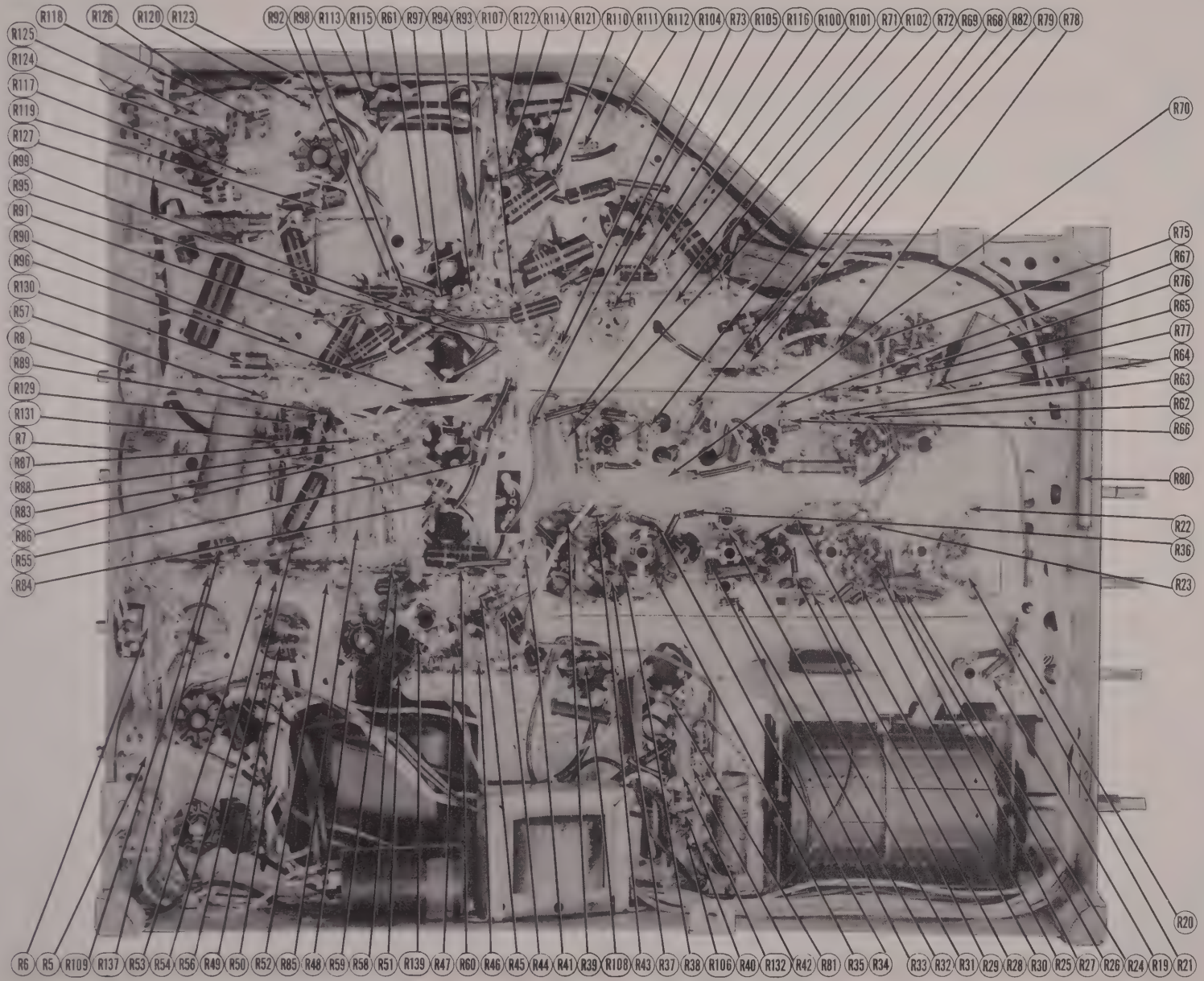
RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
V1A	RF Amp.	6BC5	6BC5	7BD	Used in code #123
B	RF Amp.	6AG5	6AG5	7BD	Used in code #122
V2A	Converter	6J6	6J6	7BF	Used in code #123
B	Converter	7F8	7F8	8BW	Used in code #122
V3A	1st Video IF	6BC5	6BC5	7BD	Used in code #123
B	1st Video IF	6AG5	6AG5	7BD	Used in code #122
V4A	2nd Video IF	6BC5	6BC5	7BD	Used in code #123
B	2nd Video IF	6AG5	6AG5	7BD	Used in code #122
V5A	3rd Video IF	6BC5	6BC5	7BD	Used in code #123
B	3rd Video IF	6AG5	6AG5	7BD	Used in code #122
V6A	4th Video IF	6BC5	6BC5	7BD	Used in code #123
B	4th Video IF	6AG5	6AG5	7BD	Used in code #122
V7	Video Det.-AGC Rect.	6AL5	6AL5	6BT	
V8	Video Amp.	6AU6	6AU6	7BK	
V9	Video Output	7C5	7C5	6AA	
V10	DC Rest.-Sync. Amp.	7F7	7F7	8AC	
V11	1st Sound IF	6BA6	6BA6	7BK	
V12	2nd Sound IF	6AU6	6AU6	7BK	
V13	Ratio Det.	6AL5	6AL5	6BT	
V14	AF Amp.	6AU6	6AU6	7BK	
V15	Audio Output	6K6GT	6K6GT	7S	
V16	Sync. Amp.-Sync. Sep.	7N7	7N7	8AC	
V17	Vert. Osc.-Vert. Disch.	7N7	7N7	8AC	
V18	Vert. Output	6K6GT	6K6GT	7S	
V19	Hor. AFC -Hor. Oscillator	7N7	7N7	8AC	
V20	Hor. Output	6BG6G	6BG6G	5BT	
V21	Damper	6W4GT	6W4GT	4CG	
V22	HV Rect.	1B3GT	1B3GT	3C	
V23	HV Rect.	1B3GT	1B3GT	3C	
V24	LV Rect.	5U4G	5U4G	5T	
V25	LV Rect.	7Z4	7Z4	5AB	
V26	Picture Tube	12LP4	12LP4	12D	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	
C1	30	475	30-2568-19	AF6X			TVL-7	Filter
C2A	40	475	30-2570-8	AF8422J			TVL-40	▲ Filter
B	20	475						■ Filter
C	10	475						▲ Filter
D	10	475						Filter
C3	30	250	30-2568-19	AF6F			TVL-63	Filter
C4A	10	450	30-2570-16	AF22J, PRS50/50			TVL-52	■ Decoupling
B	10	450						▲ Decoupling
C	40	50						Output Cathode Bypass
C5A	10	450	30-2570-16	AF22J, PRS50/50			TVL-52	■ Vert. Osc. Decoupling
B	40	50						Vert. Output Cath. Bypass
C6A	10	475	30-2570-10	AF2222X			TVL-39	▲ Vert. Osc. Plate Decoup.
B	10	475						■ Sync. Amp. Plate Decoup.
C	10	475						▲ Decoupling
D	10	475						Decoupling
C7A	10	475	30-2570-10	AFH2222X			TVL-39	▲ V. Output Screen Bypass
B	10	475						▲ V. Output Plate Decoup.
C	10	475						Decoupling
C8	10	25	30-2417-1	E26A274			TVA-5	AGC Filter
C9	2	50	30-2417-7	E26E6			TVA-12	Stabilizing Cap.
C10	5		30-1224-5	SI5CNPO	D2-4.7	NPOK-5		Fixed Trimmer *
C11	120		60-10125237	GP120M	D6-121	GP2K-120		RF Decoupling
C12	1000		45-3505-52	GP1000M	D6-102	GP2L-001		RF Filament Bypass
C13	100		62-215001011	GP100M	D6-101	GP1K-100		RF Coupling
C14	20		60-00205307	SI20JNPO	D2-20	NPOK-20		Osc. Grid Cap.
C15	10		62-010009001	SI10JN750	DN-10	N750K-10		Fixed Trimmer
C16A	1000		45-3505-52	GP1000M	D6-102	GP2L-001	29C7	RF Bypass
B	1000		45-3505-52	GP1000M	D6-102	GP2L-001		Conv. Filament Bypass
C17	10		62-010009001	CN10JNPO	D2-10	NPOK-10		Fixed Trimmer
C18	1000		45-3505-52	GP1000M	D6-102	GP2L-001	29C4	Conv. Plate Decoupling *
C19	100		62-21500101	GP100M	D6-101	GP1K-100		Filament Bypass *
C20	120	300	60-10125237	GP120K	D6-121	GP2K-120		IF Coupling
C21	51		30-1224-2	SI51JN220	D2-51	NPOM-50	MS-45	Fixed Trimmer
C22	51		30-1224-2	SI51JN220	D2-51	NPOM-50	MS-45	Fixed Trimmer
C23	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C24	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C25	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	RF Bypass
C26	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	1st V. IF Decoupling
C27	470		62-147001001	GP470M	D6-471	GP2K-470	1FM-35	IF Coupling
C28	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	2nd V. IF Decoupling
C29	10		62-010009001	GP10K	D6-100	GP1K-10	MS-41	2nd V. IF Decoupling
C30	470		62-147001001	GP470M	D6-471	GP2K-470	1FM-35	IF Coupling
C31	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C32	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	3rd V. IF Decoupling
C33	10		62-010009001	GP10K	D6-100	GP1K-10	MS-41	3rd V. IF Decoupling
C34	470		62-147001001	GP1500M	D6-471	GP2K-470	1FM-35	IF Coupling
C35	51		30-1224-2	SI51JN220	D2-51	NPOM-50	MS-45	Fixed Trimmer
C36	51		30-1224-2	SI51JN220	D2-51	NPOM-50	MS-45	Fixed Trimmer
C37	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	4th V. IF Cath. Bypass
C38	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	4th V. IF Decoupling
C39	470		62-147001001	GP470M	D6-471	GP2K-470	1FM-35	IF Coupling
C40	100		62-110009001	GP100M	D6-101	GP1K-100	1FM-31	IF Coupling
C41	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	DAGC Decoupling
C42	1500		62-215001011	GP1500M	D6-152	GP2L-0015	1FM-215	AGC Filter
C43	100		62-110009001	GP100M	D6-101	GP1K-100	1FM-31	AGC Filter
C44	100		62-110009001	GP100M	D6-101	GP1K-100	1FM-31	Bias Filter
C45	10		62-010009001	GP10K	D6-100	GP1K-10	MS-41	V. Diode Filter
C46	.047	400	45-3505-28	P488-047			TM-15	Video Coupling

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (CONT.)

ITEM No.	RATING CAP.	RATING VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C47	680		60-10685401	GP680M	D6-681	GP2K-680	1FM-37	V. Amp. Cath. Bypass †
C48	470		62-147001001	GP470M	D6-471	GP2K-470	1FM-35	Filament Bypass
C49	56		62-056409001	GP5IK	D2-56	GP1K-56	MS-45	Fixed Trimmer
C50	.1	400	45-3505-47	P488-1			TM-1	Video Coupling
C51	.047	400	45-3505-28	P488-047			TM-15	Video Coupling
C52	.0047	600	45-3505-56	P688-0047	D6-472	GP2M-0047	TM-25	Video Coupling
C53	56		62-056409001	GP5IK	D6-560	GP1K-56	MS-45	Fixed Trimmer
C54	.01	100	45-3505-41	P488-01	D6-103	821-01	TM-11	S. IF Coupling
C55	470		62-147001001	GP470M	D6-471	GP2K-470	1FM-35	1st S. IF Cathode Bypass
C56	1500		62-215001001	GP1500M	D6-152	GP2L-0015	1FM-215	1st S. IF Decoupling
C57	56		62-056409001	GP5IK	D6-560	GP1K-56	1FM-45	S. IF Coupling
C58	1500		62-215001001	GP1500M	D6-152	GP2L-0015	1FM-215	RF Bypass
C59	1500		62-215001001	GP1500M	D6-152	GP2L-0015	1FM-215	RF Bypass
C60	1500		62-215001001	GP1500M	D6-152	GP2L-0015	1FM-215	2nd S. IF Decoupling
C61	100		62-110009001	GP100M	D6-101	GP1K-100	1FM-31	Diode Load Cap.
C62	1500		62-215001001	GP1500M	D6-152	GP2L-0015	1FM-215	RF Bypass
C63	100		62-110009001	GP100M	D6-101	GP1K-100	1FM-31	RF Bypass
C64	.01	400	45-3505-41	P488-01	D6-103	821-01	TM-11	Audio Coupling
C65	100		62-110009001	GP100M	D6-101	GP1K-100	1FM-31	Tone Compensation
C66	.0022	400	45-3505-54	P488-0022	D6-222	GP2M-0022	TM-22	Tone Compensation
C67	.01	400	45-3505-41	P488-01	D6-103	821-01	TM-11	Audio Coupling
C68	.1	400	45-3505-47	P488-1			TM-1	AF Amp. Screen Bypass
C69	.01	600	45-3505-41	P688-01	D6-103	821-01	TM-11	Audio Coupling
C70	.0068	1000	45-3505-57	P1068-0068	D6-682		MB-27	Output Plate Bypass
C71	.047	400	45-3505-45	P488-047			TM-15	Sync. Coupling
C72	330	500	60-10335407	1468-00035	D6-331	GP2K-330	1FM-335	Sync. Coupling
C73	22	500	62-132009001	1468-000025	D6-220	GP1K-22	MS-425	Sync. Sep. Grid Bypass
C74	.047	400	81-0122	P488-047			TM-15	Sync. Coupling
C75	330	500	62-132001001	1468-00035	D6-331	GP2K-220	1FM-325	RF Bypass
C76	.082	400	30-4651-3	P488-075			TM-1	2nd Sync. Amp. Cath. Bypass
C77	.0022	600	45-3505-54	P688-0022	D6-222	GP2M-0022	TM-22	Integrator Net.
C78	.0047	600	45-3505-56	P688-0047	D6-472	GP2M-0047	TM-25	Integrator Net.
C79	.0047	600	45-3505-56	P688-0047	D6-472	GP2M-0047	TM-25	Integrator Net.
C80	.0022	600	45-3505-54	P688-0022	D6-222	GP2M-0022	TM-22	Fixed Trimmer
C81	.0047	600	45-3505-56	P688-0047	D6-472	GP2M-0047	TM-25	Vert. Osc. Grid Cap.
C82	.047	400	45-3505-63	P488-047			TM-15	Vert. Discharge
C83	.068	400	45-3501	P488-068				Vert. Discharge
C84	.1	400	45-3505-47	P488-1			TM-1	Vert. Sweep Coupling
C85	150	500	60-10155407	1469-00015	D6-151	GP2K-150	MS-315	Hor. Sync. Coupling
C86	180	500	30-1230-30	1469-00015	D6-181	GP2K-180	MS-315	Voltage Divider
C87	.0022	600	45-3505-54	P688-0022	D6-222	GP2M-0022	TM-22	Hor. Sync. Coupling
C88	.022	400	81-0108	P488-022			TM-13	AFC Filter
C89	.22	400	45-3505-49	P488-22			TC-2	AFC Filter
C90	5	500	60-90505007	1468-000005	D2-4.7	NPOK-5	MS-55	Hor. Feedback
C91	.047	400	45-3505-45	P488-047			TM-15	Hor. AFC Plate Bypass
C92	270	500	60-10275407	1469-00025	D6-271	GP2K-270	MS-325	Hor. Osc. Grid Cap.
C93	1500	500	80-20155014	1464-0015	D6-152	GP2L-0015	1FM-215	Hor. Discharge
C94	390	500	60-10395407	1468-0004	D6-391	GP2K-390	1FM-34	Hor. Sweep Coupling
C95	.047	400	45-3505-62	P488-047			TM-15	Hor. Output Screen Bypass
C96	.047	400	45-3505-63	P488-047			TM-15	Damper Filter
C97	.047	400	45-3505-63	P488-047			TM-15	Damper Filter
C98	.47	200	81-0133	P288-47			TC-5	Hor. Sweep Coupling
C99	500	20000	30-1229-2		TV1-502			Voltage Doubler Cap.
C100	500	20000	30-1229-2		TV1-502			HV Filter
C101	500	20000	30-1229-2		TV1-502			BV Filter
C102	.47	200	81-0137	P288-47			TC-5	Pic. Tube Cath. Bypass
C103	.1	200	45-3505-30	P288-1			TM-1	Bias Filter
C104	.01	600	45-3505-41	P688-01	D6-103	821-01	TM-11	Line Filter
C105	.01	600	45-3505-41	P688-01	D6-103	821-01	TM-11	Line Filter
C106	470		62-147001001	GP470M	D6-470	GP2K-470	1FM-35	RF Bypass *

* Not used in all models.
† Model 50-T1443 code 123 before run 5 uses .0033MFD in this application. Part No. 45-5305-55.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	50KΩ	½	33-5583-3	B11-123 *			Horiz. hold control, panel
B	1 Meg.	½		B11-137 *			Vert. hold control, rear
C	Shaft End			E-187 *			Attach per instructions in "Concentrikit"
R2A	2 Meg	½	33-5564-1	Q18-139X	T-116	BT-78-S	Volume control, tapped @ 1 Meg.
B	Switch		Not Req.	76-1	SW-A	Not Req.	Attach to R2A per instructions
R3	2000Ω	2	33-5546-33	W-2000	43-2000	V-110	Contrast control-Wire Wound
R4	100KΩ	½	33-5539-43	Q11-128	M-49-S	B-40	Brightness control
R5	10KΩ	4	33-5546-18		10-10K		Deflection control-Wire Wound
R6	5000Ω	2	33-5546-10	W-5000	43-5000	V-135	Vert. linearity control-Wire Wound
R7	500Ω	25	33-5547-5	PR-25-500	PW-25-500		Focus control-Wire Wound
R8	2.5 Meg.	½	33-5565-10	Q11-239	M-84-S	B-83	Height control

* Additonal parts to be used with "Concentrikit".

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
R9	3900Ω	½	66-2398340	BTS-3900	Ant. Coil Shunt
R10	47KΩ	½	66-3478340		AGC Network
R11	10KΩ	½	66-3108340		RF Plate Coil Shunt
R12	2200Ω	½	66-2228340	BTS-2200	RF Decoupling
R13	4700Ω	½	66-2478340	BTS-4700	Conv. Grid
R14	220KΩ	½	66-4228340		Conv. Grid
R15	15KΩ	½	66-3158340		Conv. Plate Coil Shunt
R16	10KΩ	½	66-3108340		Conv. Plate Decoupling
R17	10KΩ	½	66-3108340		Conv. Grid
R18	4700Ω	½	66-2478340	BTS-4700	Osc. Plate
R19	1000Ω	½	66-2018340		Parasitic Supp. -See Note 1
R20	5600Ω 5%	½	66-2568340	BTS-5600-5%	IF Filter Network-See Note 2
R21	15KΩ	½	66-3158340	BTS-15K	1st Video IF Transformer Shunt
R22	68Ω	½	66-0688340		1st Video IF Cathode
R23	330Ω	½	66-1338340	BW-½-330	1st Video IF Decoupling-Wire Wound
R24	33000Ω 20%	½	66-2338340	BTS-3300	AGC Network
R25	33000Ω 20%	½	66-2338340	BTS-3300	AGC Network
R26	5600Ω	½	66-2568340		2nd Video IF Grid
R27	120Ω	½	66-1128340		2nd Video IF Cathode

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
R28	3300Ω 20%	½	66-2338340	BTS-3300	AGC Network
R29	5600Ω	½	66-2568340	BTS-5600	3rd Video IF Grid
R30	68Ω	½	66-0688340		3rd Video IF Cathode
R31	5600Ω	½	66-2568340	BTS-5600	4th Video IF Transformer Shunt
R32	51000Ω 5%	½	66-2518240		IF Filter Network
R33	15KΩ	½	66-3158340	BTS-15K	4th Video IF Grid
R34	100Ω	½	66-1108340		4th Video IF Cathode
R35	5600Ω	½	66-2568340	BTS-5600	4th Video IF Plate
R36	1000Ω	½	66-2018340	BTS-1000	4th Video IF Decoupling
R37	27KΩ	½	66-3278340	BTS-27K	AGC Network
R38	120KΩ	½	66-4128340	BTS-120K	AGC Rect. Diode Load
R39	1000Ω	½	66-2018340	BTS-1000	Delayed AGC Network
R40	6800Ω 20%	½	66-2688340	BTS-6800	Delayed AGC Network-See Note 1
R41	1000Ω	½	66-2018340	BTS-1000	Bias Network
R42	10KΩ	½	66-3108340	BTS-10K	AGC Network
R43	33000Ω	½	66-2338340	BTS-3300	Video Det. Diode Load
R44	1 Meg.	½	66-5108340	BTS-1 Meg.	Video Amp. Grid
R45	120Ω	½	66-1124340		Video Amp. Cathode
R46	10KΩ	½	66-3108340	BTS-10K	Video Amp. Screen
R47	2700Ω 5%	1	66-2274340	BTA-2700-5%	Video Amp. Plate
R48	470KΩ 20%	½	66-4478340	BTS-470K	Video Output Grid
R49	10Ω	1	66-0108340	BW-½-10	Video Output Cathode-Wire Wound-See Note 3
R50	6800Ω	½	66-2688340	BTS-6800	Voltage Divider-See Note 1
R51	68KΩ	1	66-3684340	BTA-6800	Video Output Screen
R52	2500Ω	5	33-1335-87	AB-2500	Video Output Plate- Wire Wound
R53	470Ω	1	66-1474340	BTA-470	Video Output Plate
R54	15KΩ	1	66-3154340	BTA-15K	Video Output Plate-See Note 1
R55	10KΩ	2	66-3105340	BT-2-10K	Video Output Screen Decoupling
R56	1000Ω	2	66-2104340	BT-2-1000	Video Output Plate Decoupling
R57	100KΩ 20%	½	66-4108340	BTS-100K	Voltage Divider
R58	27KΩ	½	66-3278340	BTS-27K	Peaking Coil Shunt
R59	10KΩ	½	66-3108340	BTS-10K	Isolation
R60	470KΩ 20%	½	66-4478340	BTS-470K	Picture Tube Grid
R61	1 Meg. 20%	½	66-5108340	BTS-1 Meg.	DC Rest. Load
R62	470KΩ 20%	½	66-4478340	BTS-470K	1st Sound IF Grid
R63	68Ω	½	66-0688340		1st Sound IF Cathode
R64	1000Ω	½	66-2108340	BTS-1000	1st Sound IF Decoupling
R65	330Ω	½	66-1338340	BW-½-330	Decoupling-Wire Wound
R66	68KΩ 20%	½	66-3688340		2nd Sound IF Grid
R67	10KΩ	1	66-3108340	BTA-10K	2nd Sound IF Decoupling
R68	22KΩ	1	66-3228340	BTA-22K	Voltage Divider
R69	47Ω	½	66-0478340		Balancing
R70	4.7Ω	½	66-9478340	BW-½-4.7	Ratio Det. Filament-Wire Wound
R71	330Ω	½	66-1338340		Balancing-See Note 4
R72	47KΩ	½	66-3478340	BTS-47K	Ratio Det. Diode Load
R73	10KΩ	½	66-3108340	BTS-10K	De-emphasis
R74	47KΩ 20%	½	66-3478340	BTS-47K	Tone Compensation
R75	4.7 Meg. 20%	½	66-5478340	BTS-4.7 Meg.	AF Amp. Grid
R76	560KΩ	½	66-4568340	BTS-560K	AF Amp. Screen
R77	47KΩ	1	66-3474340	BTA-47K	AF Amp. Plate
R78	1 Meg. 20%	½	66-5108340	BTS-1 Meg.	Output Grid
R79	560Ω	2	66-1564340	BT-2-560	Output Cathode
R80	1900Ω	10	33-3435-15		Decoupling-Wire Wound
R81	330Ω	1	66-1338340	BTA-330	Decoupling
R82	270Ω	2	66-1274340	BW-2-270	Filter
R83	470KΩ 20%	½	66-4478340	BTS-470K	Sync. Amp. Grid
R84	10KΩ	2	66-3104340	BT-2-10K	Sync. Amp. Plate
R85	5100Ω	5	33-1335-18		Decoupling-Wire Wound
R86	10KΩ	½	66-3108340	BTS-10K	Isolation
R87	4.7 Meg.	½	66-5478340	BTS-4.7 Meg.	Sync. Sep. Grid
R88	6800Ω	½	66-2688340	BTS-6800	Sync. Sep. Grid
R89	3300Ω	2	66-2338340	BTS-3300	Voltage Divider
R90	56KΩ	2	66-3564340	BT-2-56K	Sync. Sep. Plate
R91	1 Meg.	½	66-5108340	BTS-1 Meg.	Voltage Divider
R92	4700Ω	½	66-2478340	BTS-4700	Sync. Amp. Grid
R93	1200Ω	½	66-2128340	BTS-1200	Sync. Amp. Cathode
R94	10KΩ	½	66-3108340	BTS-10K	Sync. Amp. Plate
R95	3900Ω	½	66-2398340	BTS-3900	Sync. Amp. Plate
R96	33KΩ	1	66-3334340	BTA-33K	Sync. Amp. Plate Decoupling
R97	22KΩ	½	66-3228340	BTS-22K	Integrator Network
R98	8200Ω	½	66-2828340	BTS-8200	Integrator Network
R99	8200Ω	½	66-2828340	BTS-8200	Integrator Network
R100	10KΩ	½	66-3108340	BTS-10K	Voltage Divider
R101	68KΩ	½	66-3688340	BTS-68K	Voltage Divider
R102	1 Meg.	½	66-5108340	BTS-1 Meg.	Vert. Osc. Grid
R103	100KΩ	½	66-4108340	BTS-100K	Voltage Divider-See Note 1
R104	100KΩ	1	66-4108340	BTA-100K	Vert. Osc. Plate
R105	470KΩ	1	66-4474340	BTA-470K	Vert. Osc. Plate
R106	820KΩ	½	66-4828340	BTS-820K	Vert. Peaking
R107	3900Ω	½	66-2398340	BTS-3900	Vert. Peaking
R108	2.2 Meg. 20%	½	66-5228340	BTS-2.2 Meg.	Vert. Output Grid
R109	1000Ω	1	66-2108340	BTA-1000	Vert. Output Cathode
R110	560KΩ	½	66-4568340	BTS-560K	Horiz. AFC Grid
R111	180KΩ	½	66-4188340	BTS-180K	Horiz. AFC Cathode
R112	100KΩ 5%	1	66-4108340	BTA-100K-5%	Horiz. AFC Cathode
R113	8200Ω	½	66-2828340	BTS-8200	Horiz. AFC Filter Network
R114	3.3 Meg. 5%	1	66-5338340	BTA-3.3Meg. 5%	Voltage Divider
R115	82KΩ	1	66-3824340	BTA-82K	Voltage Divider
R116	42KΩ	½	33-1343-2		Voltage Divider-Temp. Compensating
R117	560KΩ 5%	½	66-4568340	BTS-560K-5%	Feedback Network
R118	220KΩ	½	66-4228340	BTS-220K	Horiz. AFC Filter Network
R119	10KΩ	½	66-3108340	BTS-10K	Filter
R120	10KΩ	½	66-3108340	BTS-10K	Decoupling
R121	82KΩ 5%	1		BTA-82K-5%	Horiz. Osc. Grid
R122	10KΩ 5%	½	66-3108340	BTS-10K-5%	Horiz. Osc. Transformer Shunt
R123	68KΩ 5%	1	66-3688340	BTA-68K-5%	Horiz. Osc. Plate
R124	100Ω 20%	½	66-1108340		Parasitic Supp.
R125	330KΩ	½	66-4338340	BTS-330K	Horiz. Output Grid
R126	100Ω	2	66-1105340	BW-2-100	Horiz. Output Cathode-Wire Wound
R127	3900Ω	2	66-2395340	BT-2-3900	Horiz. Output Screen
R128	2 Meg.	2	33-1338		HV Rect. Load-Wire Wound
R129	47KΩ	½	66-3478340	BTS-47K	Bias Network
R130	12Ω	2	66-0125340	BW-2-12	Bias Network
R131	12Ω	2	66-0125340	BW-2-12	Bias Network
R132	220KΩ 20%	2	66-4224340	BT-2-220K	Voltage Divider
R133	18KΩ	10	33-1335-86	AB-18,000	Bleeder-Wire Wound

RESISTORS (CONT.)

ITEM No.	RATING RESISTANCE	RATING WATTS	PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
R134	5600Ω	2	66-2564340	BT-2-5600	Filter Network-See Note 1
R135	5600Ω	2	66-2564340	BT-2-5600	Filter Network-See Note 1
R136	5600Ω	2	66-2564340	BT-2-5600	Filter Network-See Note 1
R137	56Ω	2	66-0568340		Surge Limiter
R138	47KΩ	½	66-3478340	BTS-47K	Peaking Coil Shunt-See Note 1
R139	82KΩ	1	66-3824340	BTS-82K	Voltage Divider-See Note 1

Note 1. Not used in all models.
Note 2. Some models use 18KΩ resistor in this application.
Note 3. Some models use 47Ω resistor in this application.
Note 4. Some models use 2200Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC @ 2A	700VCT .190ADC 400VCT .093ADC	5VAC @ 3A	6.3VAC @ 1IA	32-8391		P-3067	

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING DC RESISTANCE PRI.	RATING DC RESISTANCE SEC.	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	166Ω	320Ω	32-8304-3				Vert. Block Osc. Trans.
T3	280Ω Tap @ 40Ω	9.3Ω Tap @ .9Ω SEC. 2 0Ω SEC. 3 0Ω	32-8398		HVO-6		Horiz. Output Trans.
T4	940Ω	10.1Ω	32-8405-1	A-8112 *	A-3036	TSO-5	Vert. Output Trans.
T5A	13.5Ω						Horiz. Deflection Coil
B	68Ω						Vert. Deflection Coil
T6	160Ω						Focus Coil

* Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T7	4.6KΩ	4Ω	510Ω	.4Ω	32-8356	A-3877	A-2930	RO-8 ■	● Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS FIELD RES.	RATINGS V. C. IMP.	PHILCO PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	PM	4Ω	36-1629-2	525J4	52A21	
	CONE DIA.	V. C. DIA.				
SP2	5"	9/16"				

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ↺)	PHILCO PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.190A	78Ω	6.1 Henries	32-8399	C-1646 ¶	C-3196	R-7200	¶ Drill new mounting holes.
L2	.093A	153Ω	6 Henries	32-8355-1	C-2303 *	C-2974 *	R-885 *	* Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	PHILCO PART No.	MEISSNER PART No.	NOTES
L3	Ant. & RF Grid	0Ω				Code 123 only. Part of 76-5411-3
L4	Fil. Choke	.1Ω		32-4112-15		
L5	RF, Mixer Grid & Osc.	0Ω				Part of 76-5411-3. Code 123 only.
L6	Fil. Choke	.1Ω		32-4112-15		
L7	Mixer Plate	0Ω				Part of 76-5411-3. Code 123 only.
L8	Adj. Channel Sound Trap			32-4234-4		
L9	RF Choke	.1Ω		32-4112-11		
L10	1st Video IF	.2Ω		32-4233-4		
L11	Fil. Choke	.1Ω		32-4112-15		
L12	2nd Video IF	.2Ω		32-4359		

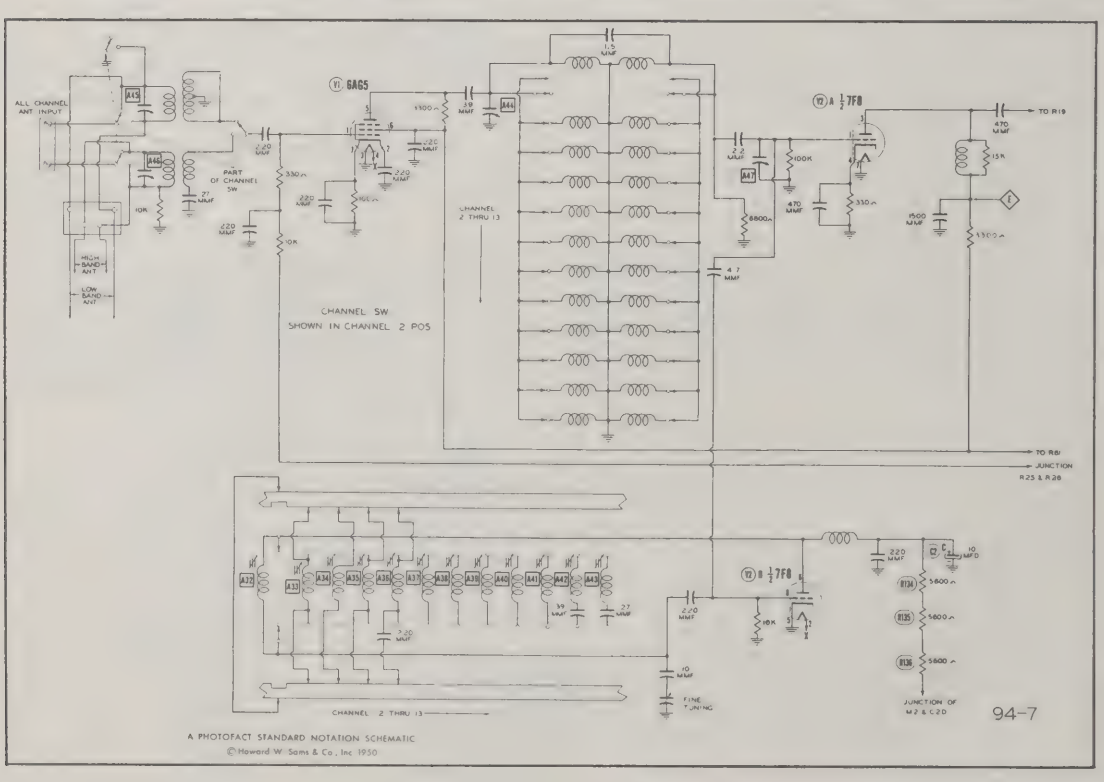
PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF) CONT.

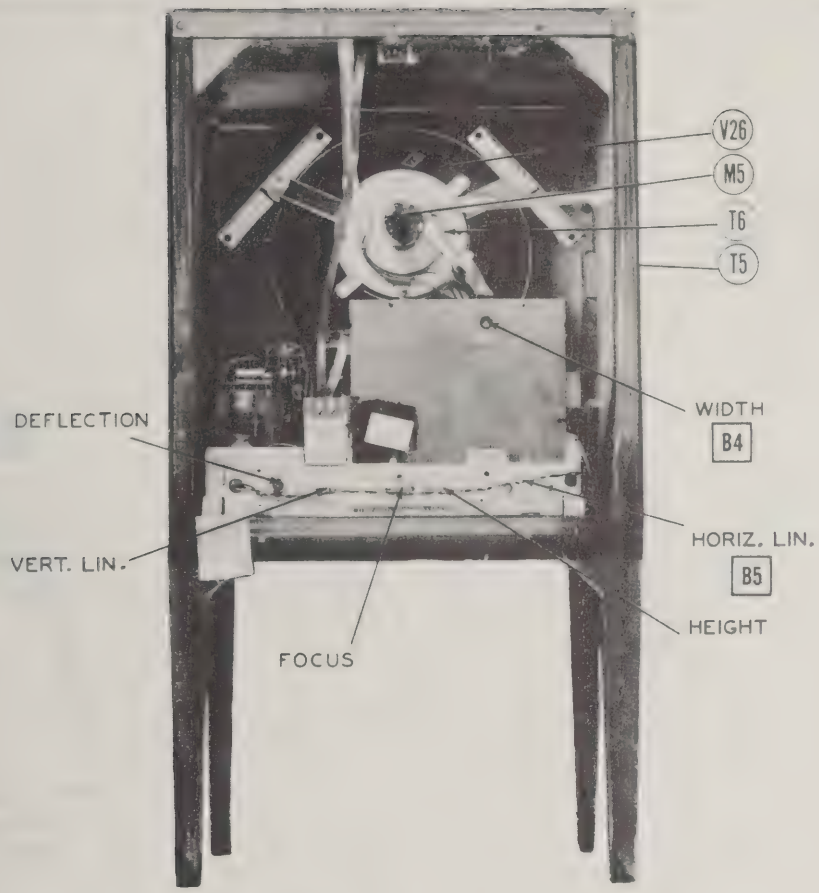
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	REPLACEMENT DATA MEISSNER PART No.	NOTES
L13	3rd Video IF	.2Ω		32-4359		
L14	RF Choke	.1Ω		32-4112-11		
L15	RF Choke	.1Ω		32-4112-11		
L16	Fil. Choke	.1Ω		32-4112-15		
L17	4th Video IF	.2Ω		32-4234-1		
L18	Sound Trap	.2Ω		32-4233-7		
L19	4th Video IF Grid	.5Ω		32-4233-2		
L20	Fil. Choke	.1Ω		32-4112-15		
L21	RF Choke	.1Ω		32-4112-11		
L22	5th Video IF	.2Ω		32-4234-1		
L23	Peaking	.3Ω		32-4143-10		10 microhenry-white identification dot.
L24	Peaking	5Ω		32-4143		40 microhenry-green identification dot.
L25	Peaking	2.5Ω				Yellow identification dot.
L26	Fil. Choke	.1Ω		32-4112-15		
L27	Peaking	3Ω		32-4143-2		
L28	4.5MC Sound Trap	1.1Ω		32-4155		
L29	Peaking	5Ω		32-4143-5		180 microhenries, code 123 only, green identification dot.
L30	Peaking	5.5Ω		32-4143		Yellow identification dot.
L31	1st Sound IF	.1Ω		32-4303		
L32	2nd Sound IF	.8Ω	.8Ω	32-4236		
L33	Fil. Choke	.1Ω		32-4112-15		
L34	Ratio Det. Trans.	.1Ω	0Ω	32-4317		
L35	RF Choke	5.5Ω		32-4061-2		Code 123 only
L36	Horiz. Osc. Trans.	150Ω		32-4367		Tapped at 44Ω from blue lead
L37	Horiz. Size	.6Ω		32-4419-1		
L38	Horiz. Linearity	18Ω		32-4211		

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M1A	RF Tuner	76-5411-3	Code 123
B	RF Tuner	76-4402-5	Code 122
M2	Fuse	45-2656-10	Type AGX 3/8 A
M3	Fuse	45-2656-11	Type MDL 5A
M4	Switch	42-1893-1	TV-Phono
M5	Ion Trap	76-3913-2	
M6	Antenna	56-7635	Broad Band Dipole. 2 used
M7	Loop Assembly	76-5413	Antenna Tuning, Consists of 2 coils and trimmer
	Knob	54-4750	Antenna Tuning
	Knob	54-4703	Brightness
	Knob	54-4706	Channel Selector
	Knob	54-4701	Fine Tuning
	Knob	54-4703	Contrast
	Knob	54-4707	Horiz. hold
	Knob	54-4699	Vert. hold
	Knob	54-4703	Volume



ALTERNATE TUNER # 76-4402-5



CABINET-REAR VIEW

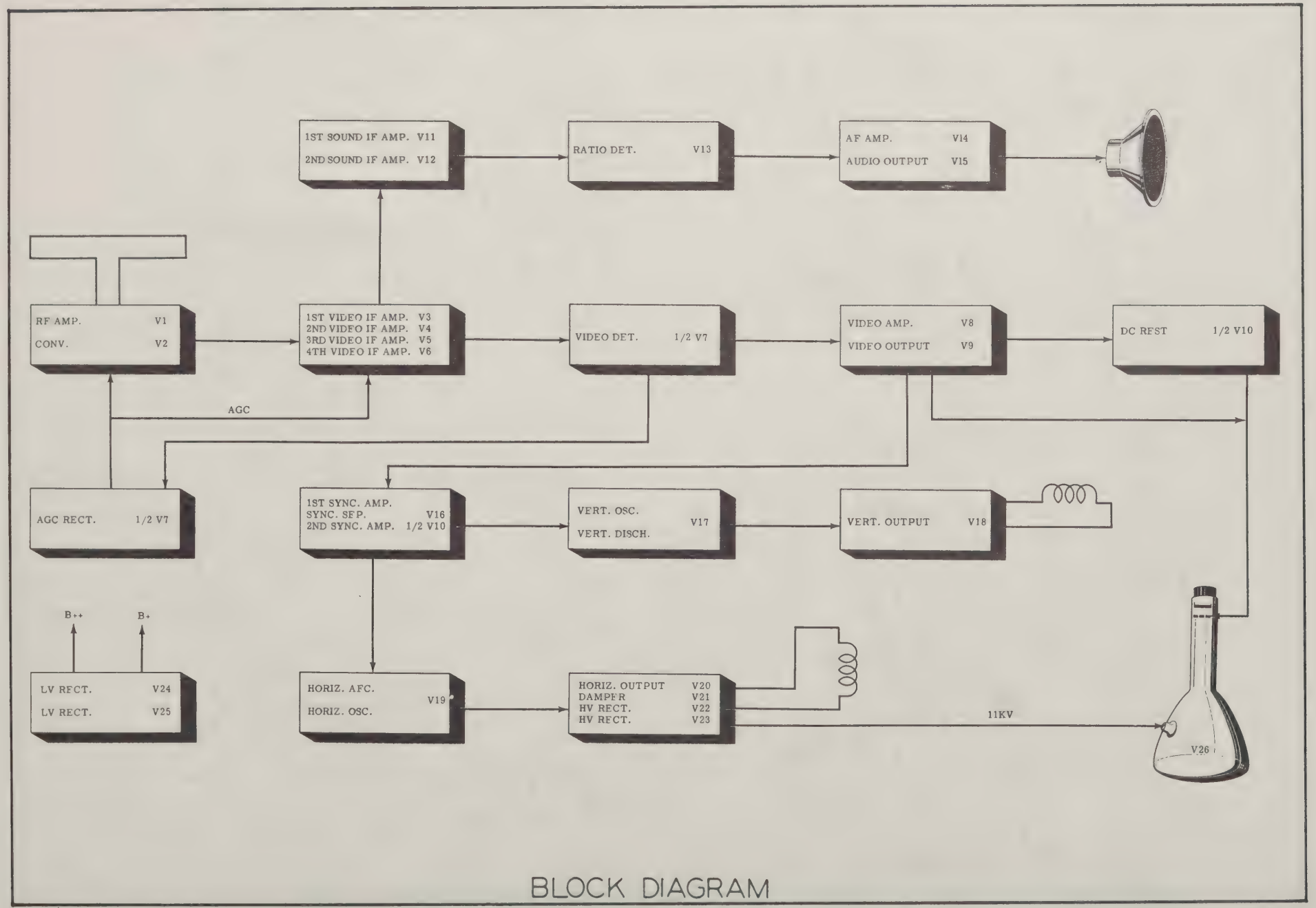
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Pre-set the following adjustments:
Horizontal lock-in trimmer (B2) 1/2 turn counter-clockwise from maximum clockwise.
Horizontal range trimmer (B3) 1 1/2 turns counter-clockwise from maximum clockwise.

Turn the set on and tune in a TV station, preferably a test pattern.
Set the horizontal hold control to the mid-position of its range.
Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally.
Turn the contrast control to approximately its normal position.
Turn the hold control fully clockwise.
Adjust B1 until 8 to 10 stationary bars sloping downward to the right are observed. If this condition can not be obtained, turn B3 one full turn counter-clockwise and repeat this step.
Turn the hold control to maximum counter-clockwise and momentarily interrupt the signal by switching to another channel and back again.
Slowly turn the hold control clockwise and carefully note the least number of bars present just before the picture falls into "sync". If more than four 1/2 bars are present just before pull-in, turn B2 1/4 turn clockwise; if less than 3 1/2 bars are present, turn B2 1/4 turn counter-clockwise. Repeat this procedure until 3 1/2 to 4 1/2 bars are present just before pull-in.
Adjust the width slug B4 until the picture is of proper size horizontally. If sufficient width cannot be obtained, turn the "deflection" control to obtain sufficient width.
Adjust the horizontal linearity slug B5 until the picture is symmetrical from left to right.

DISASSEMBLY INSTRUCTIONS

1. Remove seven push-on type control knobs.
2. Remove nine phillips head screws holding rear cover and remove cover.
3. Disconnect built-in antenna at screw connections.
4. Disconnect picture tube socket and HV cap.
5. Disconnect deflection yoke plug from chassis. Remove ground strip from yoke.
6. Remove speaker plug from chassis.
7. Remove ground strip from front of chassis which connects to picture tube support.
8. Remove four 5/16" hex head bolts holding chassis and remove chassis.
9. Remove two 11/32" hex nuts holding speaker and remove speaker.



BLOCK DIAGRAM

PHOTOFACT* Folder

RAYTHEON MODELS
C-1102, C-1104, M-701, M-1101, M-1103, M-1105

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MODEL M-1101

RAYTHEON MODELS
C-1102, C-1104, M-701, M-1101, M-1103, M-1105

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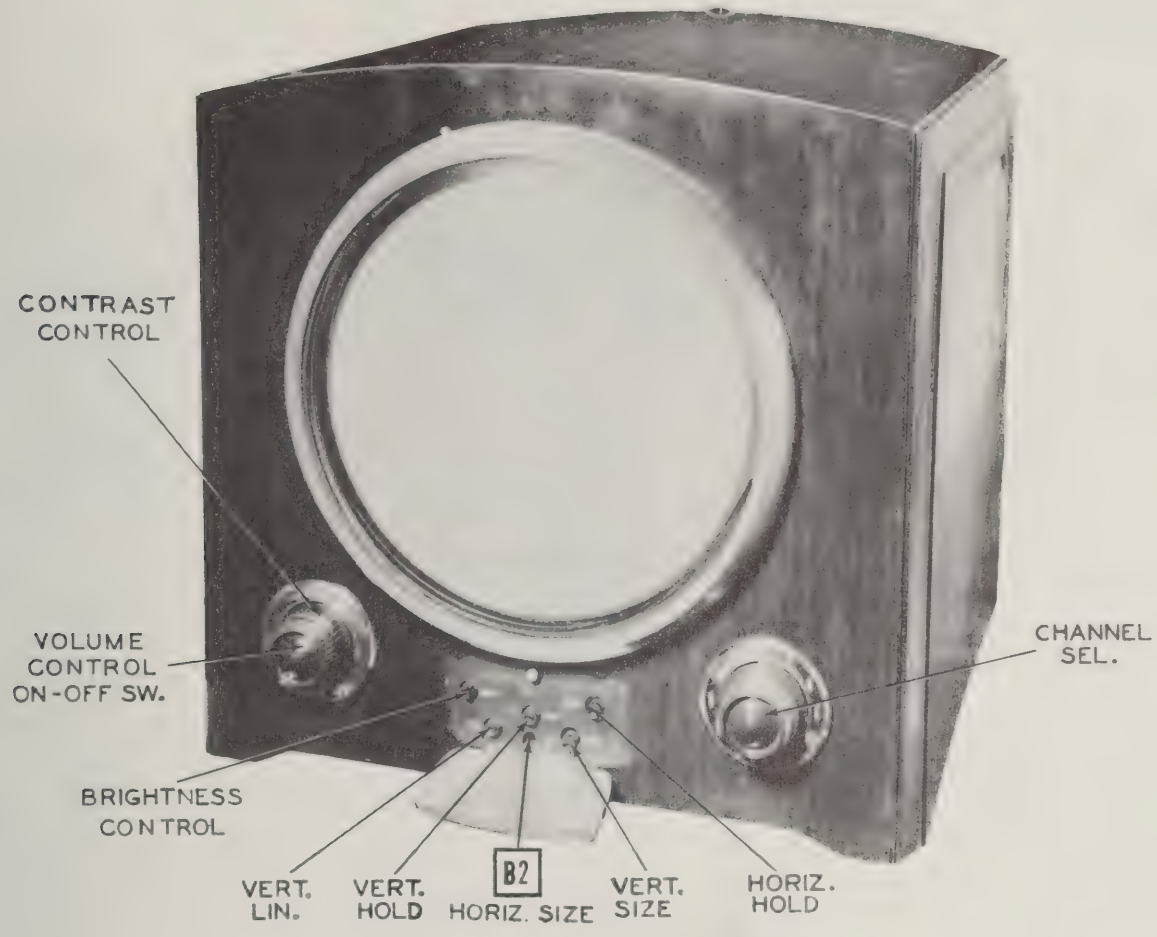
PHOTOFACT* Folder

RAYTHEON MODELS C-1102, C-1104, (Ch. 12AX22), M-701, (Ch. 10AX22), M-1101, M-1103, M-1105, (Ch. 12AX22)

RAYTHEON MODELS C-1102, C-1104, (Ch. 12AX22), M-701, (Ch. 10AX22), M-1101, M-1103, M-1105, (Ch. 12AX22)



RAYTHEON MODEL M-1101

TRADE NAME	Raytheon, Models C-1102, C-1104 (Ch. 12AX22), M-701 (Ch. 10AX22), M-1101, M-1103, M-1105 (Ch. 12AX22)
MANUFACTURER	Belmont Radio Corp., 5921 W. Dickens Ave., Chicago 39, Illinois
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110 - 120 Volts AC - 60 Cycles
RATING	1.9 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13

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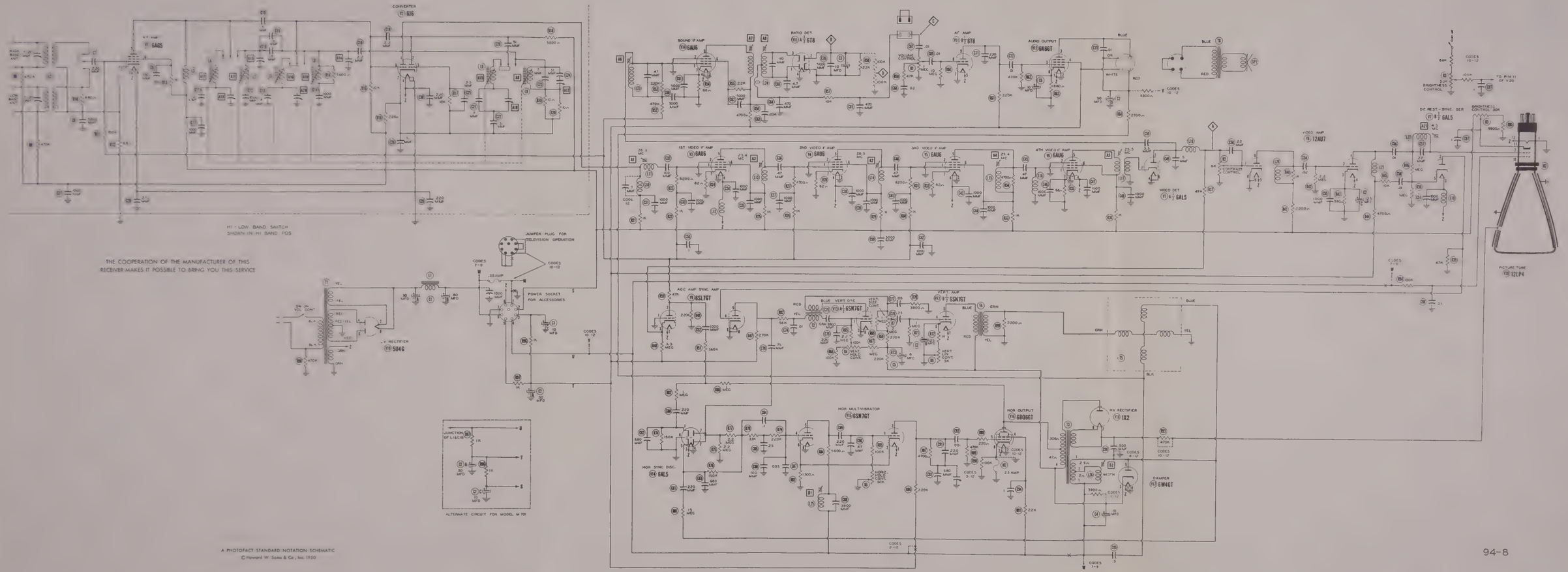
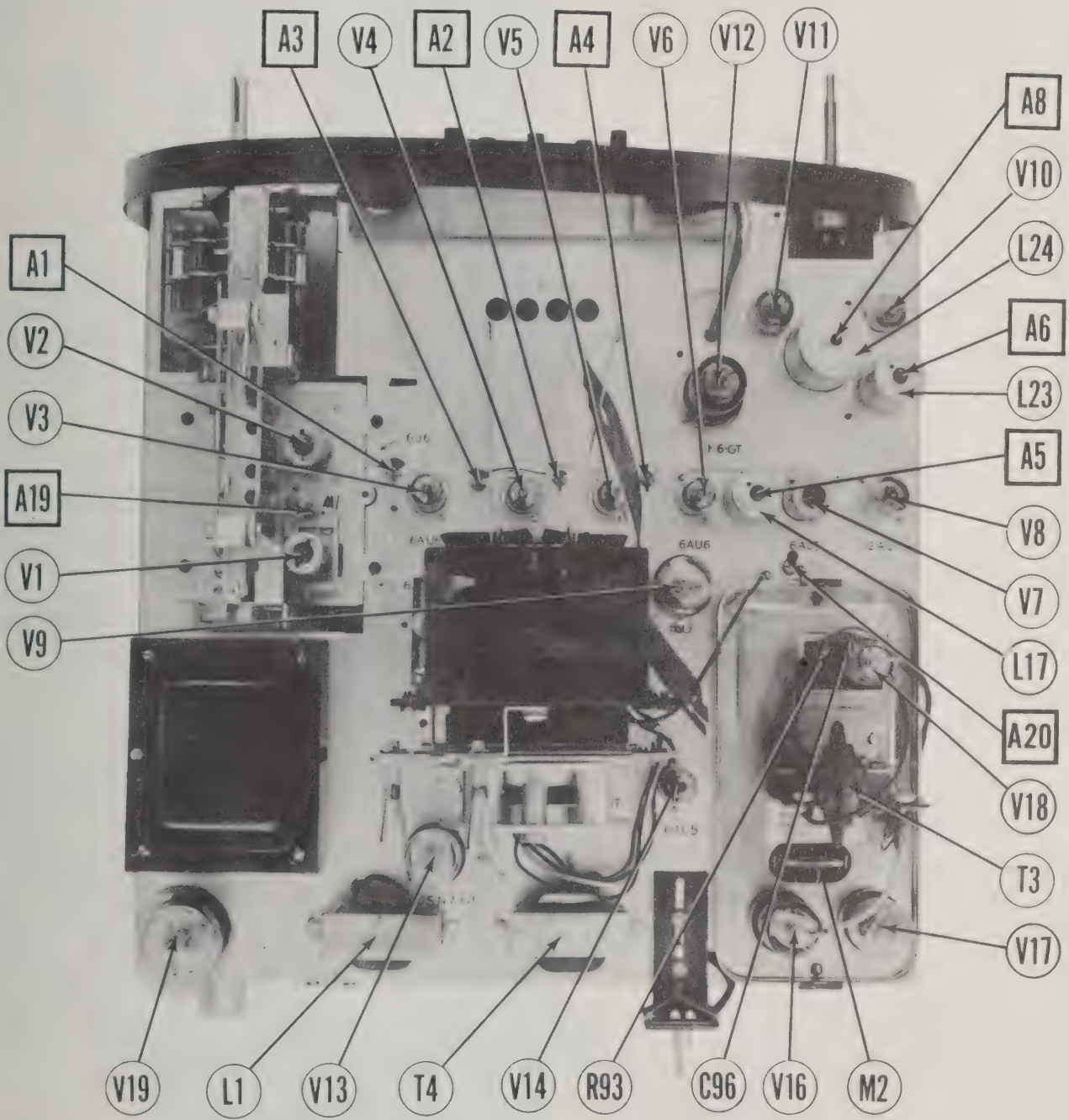
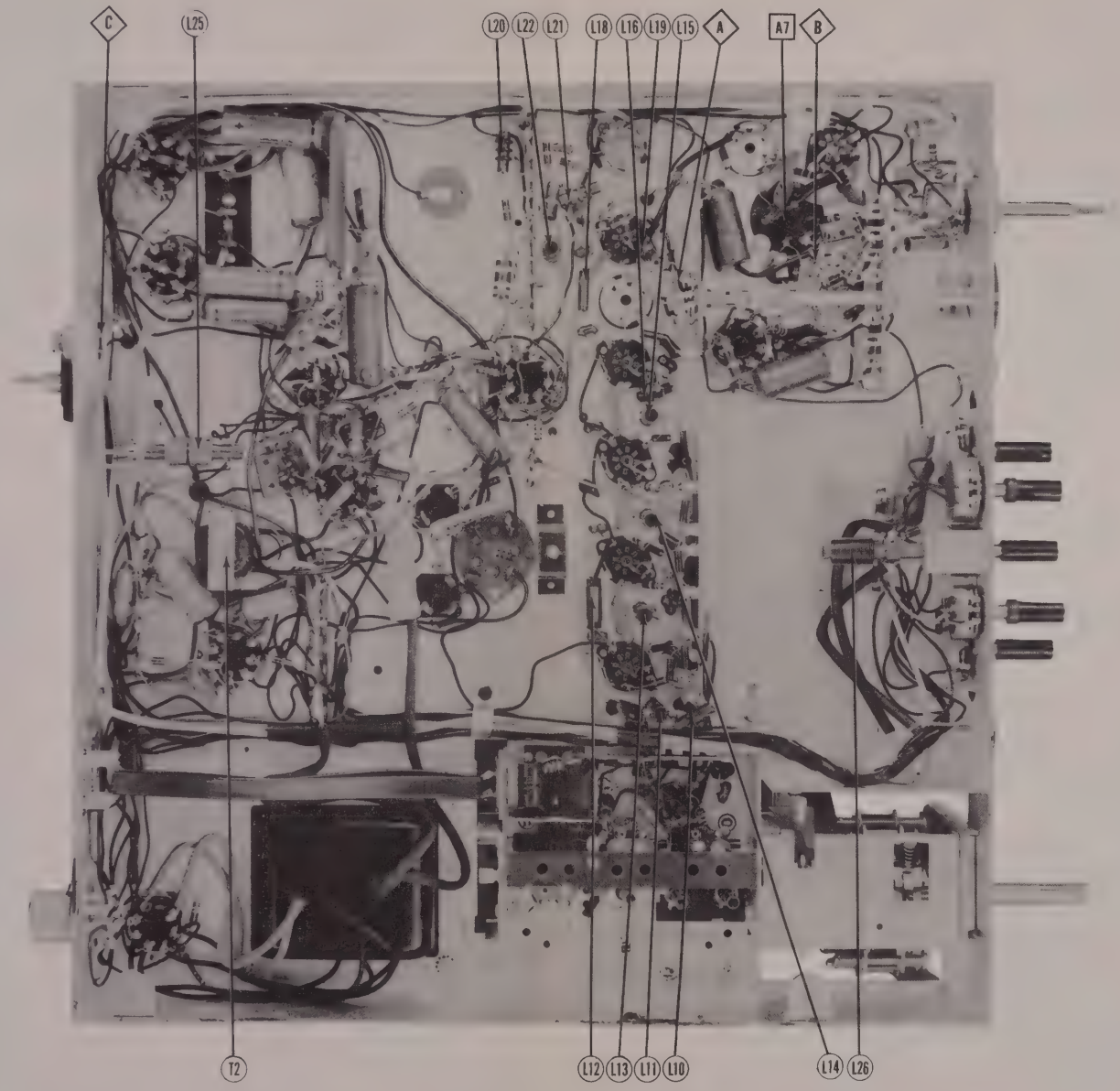
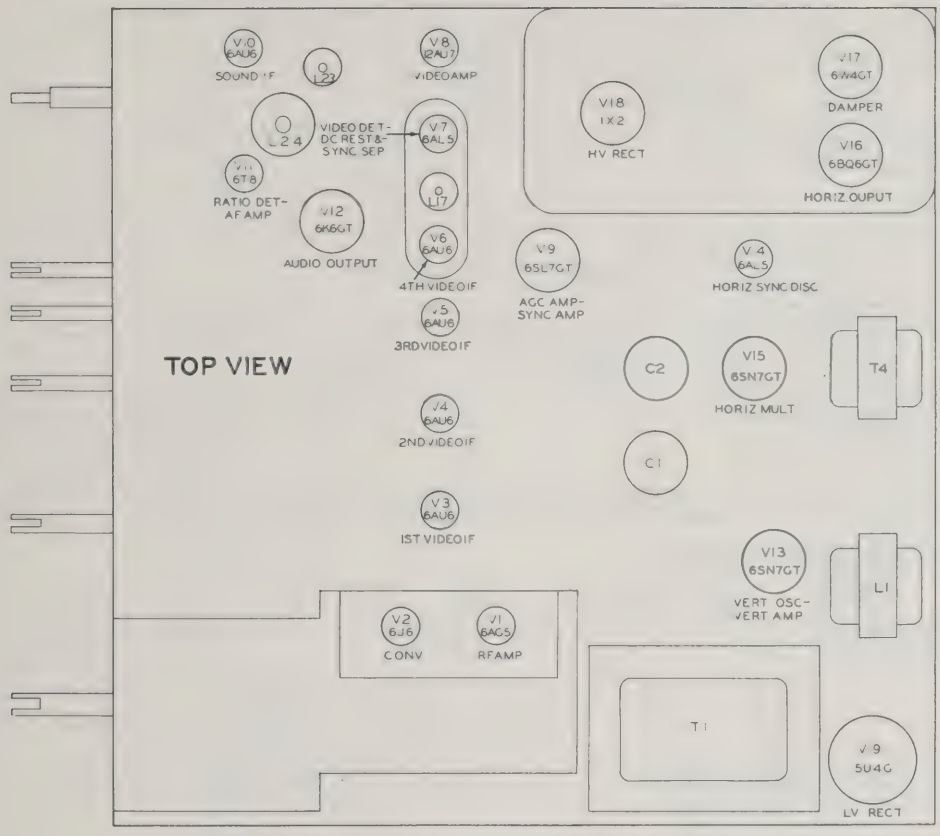

CONVERTER
V1 6J6
R.F. AMP
V1 6AG5
SOUND I.F. AMP
V10 6AU6
RATIO DET
V11 A 1/2 6T8
AF AMP
V11 B 1/2 6T8
AUDIO OUTPUT
V12 6K6GT
1ST VIDEO I.F. AMP
V7 6AU6
2ND VIDEO I.F. AMP
V6 6AU6
3RD VIDEO I.F. AMP
V5 6AU6
4TH VIDEO I.F. AMP
V8 6AU6
VIDEO DET
V17 A 1/2 6AL5
VIDEO AMP
V9 12AU7
DC REST. - SYNC. SEP.
V17 B 1/2 6AL5
PICTURE TUBE
V15 12LP4
AGC AMP SYNC AMP
V18 6SL7GT
BLUE VERT. OSC.
V13 A 1/2 6SN7GT
VERT. AMP
V13 B 1/2 6SN7GT
HOR. MULTIVIBRATOR
V16 6SN7GT
HOR. SYNC DISC.
V14 6AL5
HOR. OUTPUT
V15 6BQ6GT
HV RECTIFIER
V19 1X2
DAMPER
V20 6W4GT
HV RECTIFIER
V19 5U4G
H1 - LOW BAND SWITCH
SHOWN IN HI BAND POS.
JUMPER PLUG FOR TELEVISION OPERATION
POWER SOCKET FOR ACCESSORIES
ALTERNATE CIRCUIT FOR MODEL M 701
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1950
94-8

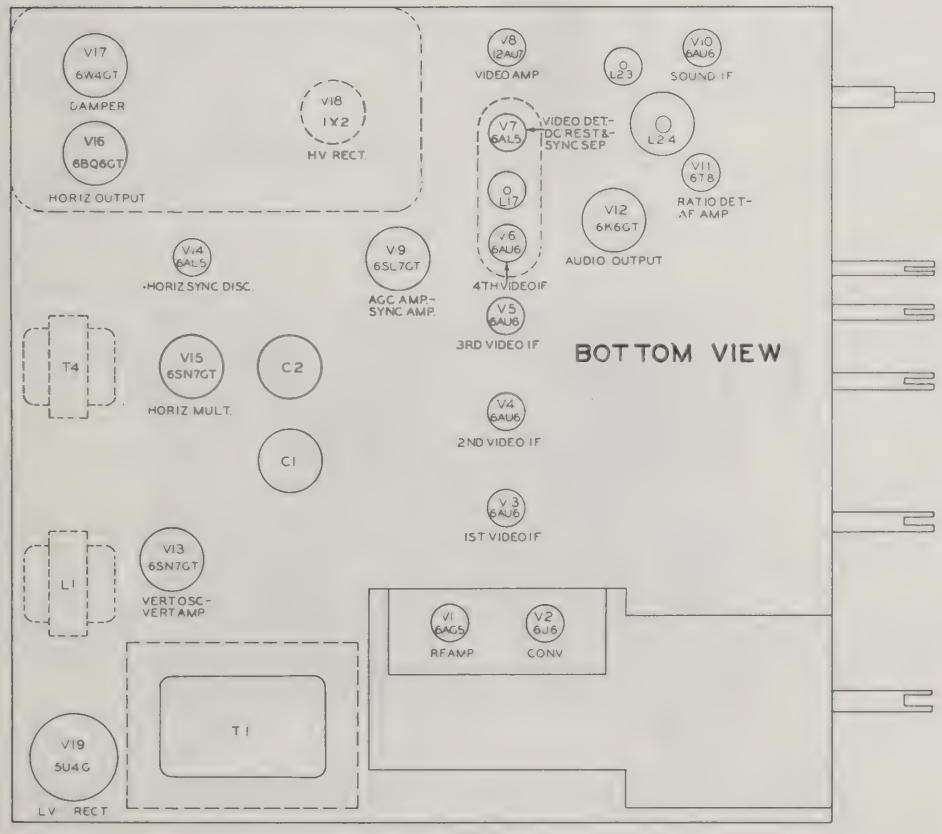


CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION





TUBE PLACEMENT CHART

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the fuse (M2), located in the high voltage power supply compartment.

VIDEO IF ALIGNMENT

Connect the negative lead of a three volt battery to the junction of R50 and C53, connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over converter tube (V2).	26.3MC (Unmod.)	Any	DC Probe to Point A Common to chassis.	A1, A2	Adjust for maximum deflection.
2.	Direct	"	23.4MC	"	"	A3, A4	"
3.	Direct	"	25.5MC	"	"	A5	"

OVERALL VIDEO IF RESPONSE CHECK

Remove the 3 volt bias battery used during video IF alignment.
Turn the contrast control to maximum clockwise.
To prevent erroneous indications, disable the local oscillator by connecting a short between pins 5 and 7 of V2 socket.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	25MC (10MC SWP)	22.25MC 26.75MC	Any	Vert. Amp. to Point A Low side to chassis.		Check for response curve similar to Fig 1 with markers as shown. If necessary retouch A5 for proper response. If adjustment of A5 will not give proper results SLIGHTLY retouch A1 thru A4 to obtain response similar to Fig 1.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

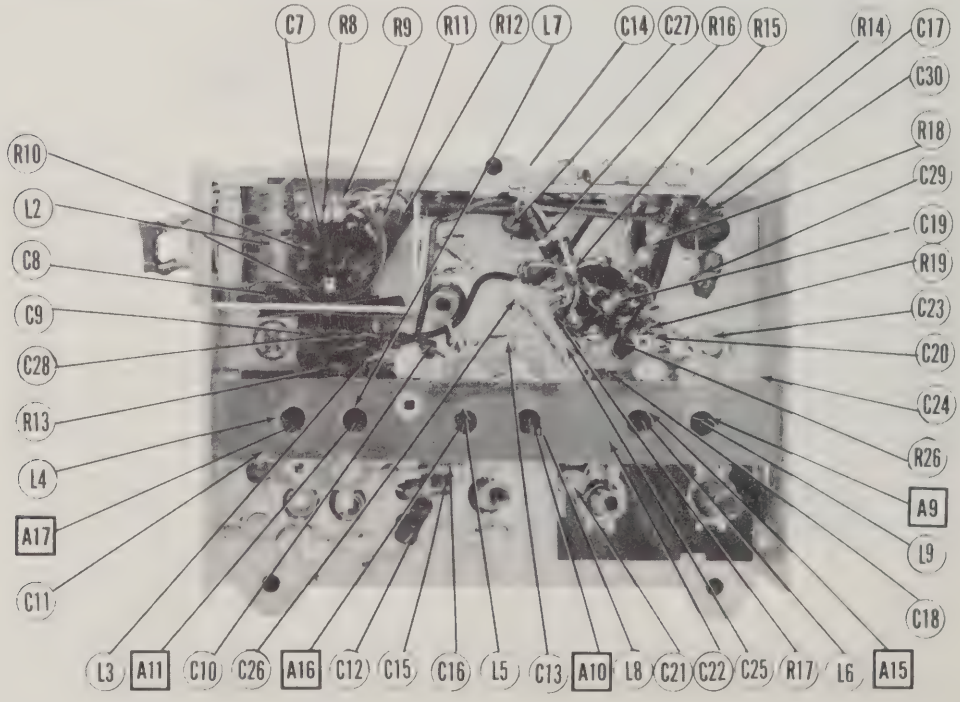
Connect two matched 100KΩ (± 1%) resistors in series from Point B to chassis. The junction of these two resistors is alignment Point D as shown on the schematic.
Short circuit the receiver antenna input terminals.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to pin 7 (plate) of 6AL5 (V7). Low side to chassis.	4.5MC (Unmod.)	Any channel not used locally	DC Probe to Point B Common to chassis.	A6, A7	Adjust for maximum deflection.
6.	.01MFD	"	"	"	DC Probe to Point C Common to Point D	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.
Short circuit the receiver antenna input terminals.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.01MFD	High side to pin 7 (plate) of 6AL5 (V7). Low side to chassis.	4.5MC (450KC SWP)	4.5MC	Any channel not used locally	Vert. Amp. to Point B Low side to chassis.	A6, A7	Disconnect stabilizer capacitor (C3). Adjust for maximum amplitude and symmetry as per Fig 2. Reconnect capacitor C3.
6.	.01MFD	"	"	"	"	Vert. Amp. to Point C Low side to chassis.	A8	Adjust A8 so 4.5MC occurs at center of crossover lines as per Fig 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.



RF TUNER-BOTTOM VIEW

ALIGNMENT INSTRUCTIONS (CONT.)

TUNER ALIGNMENT

Pre-set the tuning adjustments as shown in figure 4.
Turn the channel switch to channel 6, and turn the channel 6 station selector screw in (clockwise), until the turner carriage reaches the top of its travel. CAUTION: Turn the screw carefully and do not force it beyond the point where the carriage reaches the top of its travel; to do so will damage the tuner.
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Before beginning step 11, turn the channel switch to channel 13 and set the carriage to the top of its travel in the same manner as outlined above for channel 6.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 150Ω carbon res.	Across "lowband" antenna terminals with 150Ω resistor in each lead.	Approx. 85MC (10MC SWP)	Not used	6	Vert. Amp. to Point A. Low side to chassis.	A9, A10, A11	Adjust A9, A10, and A11 until they just begin to effect the response curve, then turn the channel 6 station selector screw until all cores enter the coils an additional 3/16 of an inch.
8.	"	"	85MC (10MC SWP)	83.25MC	6	"	A12	Adjust to place the marker at 50% on the low frequency slope of the response curve as shown in figure 5.
9.	"	"	85MC (10MC SWP)	83.25MC	6	"	A13, A14	Adjust for a reasonably flat topped response curve similar to Fig 5 with the marker at 50% response. Check all low band channels for response curve similar to Fig 5. If necessary adjust the channel selector screw, for each channel, to place the marker at 50% response. Compromise adjustment of A13 and A14 may be necessary to obtain optimum response on all low band channels.
			79MC (10MC SWP)	77.25MC	5			
			69MC (10MC SWP)	67.25MC	4			
			63MC (10MC SWP)	61.25MC	3			
10.	"	"	57MC (10MC SWP)	55.25MC	2	"		If it is possible to place the marker at 50% response by the station selector screw (with the screw at least 2 turns from fully "out") the low band is properly aligned.
11.	"	Across "highband" antenna terminals with 150Ω resistor in each lead.	Approx. 213MC (10MC SWP)	Not used	13	"	A15, A16, A17	Adjust A15, A16 and A17 until they just begin to effect the response curve, then turn the channel 13 station selector screw until the cores enter the coils an additional 1/8 of an inch.
12.	"	"	213MC (10MC SWP)	211.25MC	13	"	A18	Adjust to place marker at 50% response on low frequency slope of response curve as shown in Fig 5.
13.	"	"	207MC (10MC SWP)	205.25MC	12	"	A19, A20	Adjust for reasonably flat topped response similar to Fig 5 with the marker at 50%. Check all high band channels for response similar to Fig 5. If necessary adjust the channel selector, for each channel, to place the marker at 50% response. Compromise adjustment of A19 and A20 may be required for optimum response on all high aband channels.
			201MC (10MC SWP)	199.25MC	11			
			195MC (10MC SWP)	193.25MC	10			
			189MC (10MC SWP)	187.25MC	9			
			183MC (10MC SWP)	181.25MC	8			
14.	"	"	177MC (10MC SWP)	175.25MC	7	"		If it is possible to place the marker at 50% response by the station selector screw (with the screw at least 1 full turn from fully "out") the high band is properly aligned.

4.5MC TRAP ADJUSTMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	.01MFD	High side to pin 2 (Grid) of 12AU7 (V8). Low side to chassis.	Not used	4.5MC (400∿ Mod.)	Any channel not used locally	Vert. Amp. to pin 2 (Grid) of picture tube. Low side to chassis.	A21	Adjust for MINIMUM 400∿ response on scope.

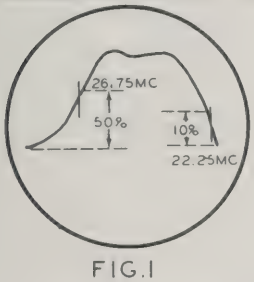


FIG. 1

FIG. 2

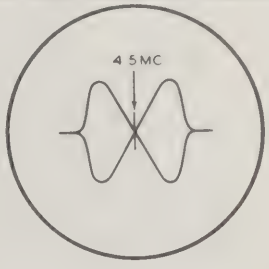


FIG. 3

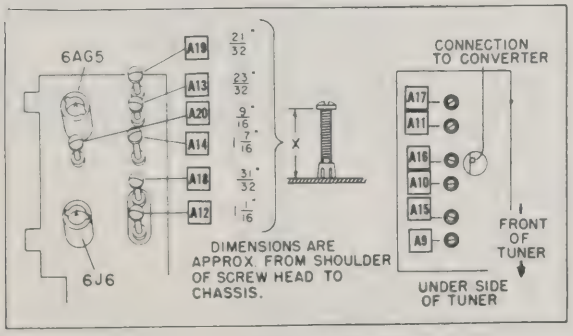


FIG. 4. **Tuner Adjustment**

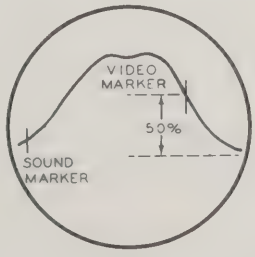


FIG. 5

VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	0V.	.9VDC	0V.	6.3VAC	150VDC	150VDC	.9VDC		
V 2	6J6	200VDC	140VDC	6.3VAC	0V.	§-1VDC	0V.	4VDC		
V 3	6AU6	-.1VDC	0V.	0V.	6.3VAC	140VDC	140VDC	1VDC		
V 4	6AU6	-.1VDC	0V.	0V.	6.3VAC	140VDC	140VDC	1 VDC		
V 5	6AU6	-.1VDC	0V.	0V.	6.3VAC	140VDC	140VDC	1 VDC		
V 6	6AU6	0V.	0V.	0V.	6.3VAC	140VDC	140VDC	.8VDC		
V 7	6AL5	0V.	-1.3VDC	6.3VAC	0V.	.3VDC	0V.	-.4VDC		
V 8	12AU7	200VDC	0V.	5.7VDC	6.3VAC	6.3VAC	120VDC	0V.	0V.	0V.
V 9	6SL7GT	0V.	-.1VDC	.4VDC	-1VDC	75VDC	0V.	6.3VAC	0V.	
V 10	6AU6	-.8VDC	0V.	0V.	6.3VAC	245VDC	120VDC	.7VDC		
V 11	6T8	-.3VDC	-.9VDC	-.7VDC	0V.	6.3VAC	0V.	0V.	-.3VDC	90VDC
V 12	6K6GT	6.3VAC	0V.	270VDC	290VDC	0V.	0V.	6.3VAC	20VDC	
V 13	6SN7GT	-20VDC -25VDC	150VDC	0V.	0V.	490VDC	10VDC 31VDC	6.3VAC	0V.	
V 14	6AL5	.2VDC	-1.5VDC	6.3VAC	0V.	.4VDC	0V.	-1.5VDC		
V 15	6SN7GT	-1.7VDC	140VDC	11VDC	-.2VDC	330VDC	11VDC	6.3VAC	0V.	
V 16	6BQ6GT	0V.	0V.	0V.	125VDC	-16VDC	-16VDC	6.3VAC	0V.	TOP CAP *
V 17	6W4GT	365VDC	510VDC	500VDC	510VDC	380VDC	530VDC	6.3VAC.	0V.	
V 18	1X2	* DO NOT MEASURE.								
V 19	5U4G	0V.	380VDC	0V.	340VAC	0V.	340VAC	0V.	380VDC	
V 20	12LP4	0V.	.1VDC	PIN 10 380VDC	PIN 11 150VDC	PIN 12 6.3VAC				

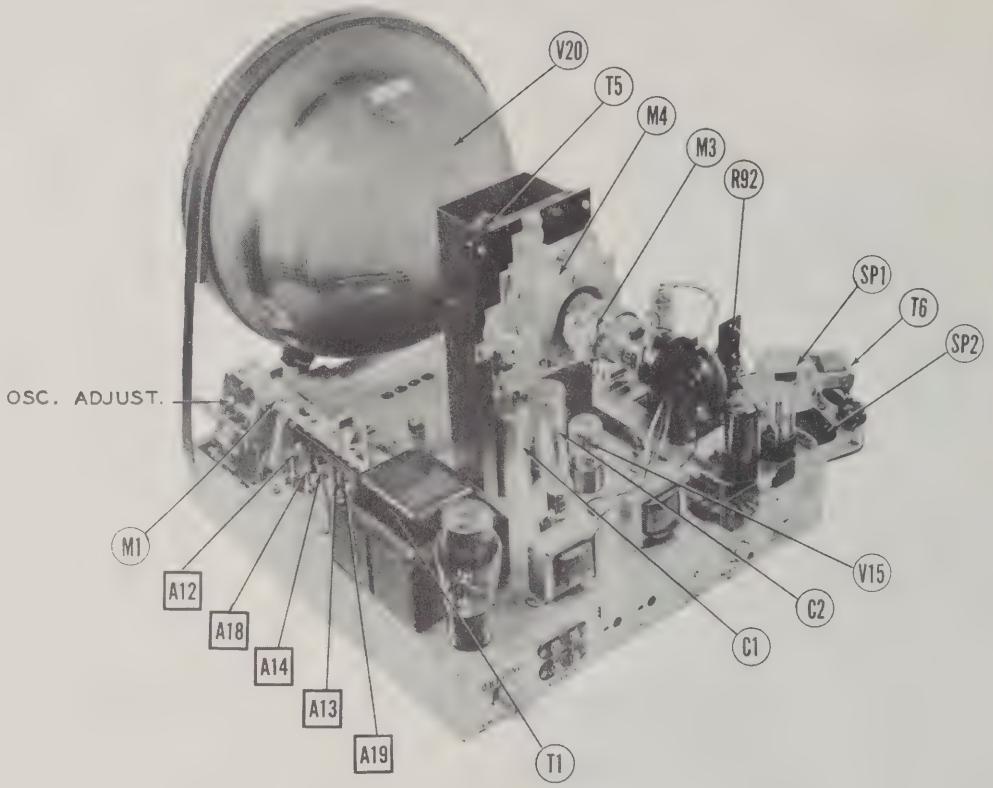
§ TAKEN WITH VACUUM TUBE VOLTMETER.
* DO NOT MEASURE.

RESISTANCE READINGS

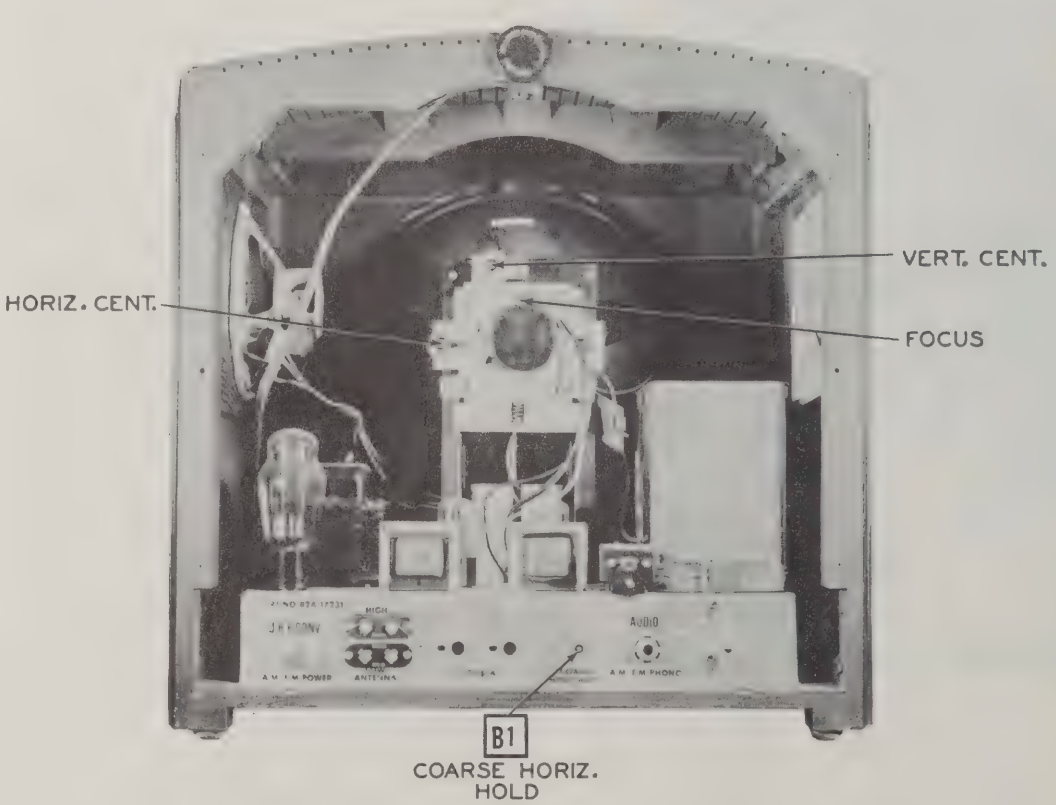
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AG5	370KΩ	68Ω	.1Ω	0Ω	†2.2KΩ	†3.2KΩ	68Ω		
V 2	6J6	†3.2KΩ	†7.8KΩ	0Ω	.1Ω	10KΩ	10KΩ	220Ω		
V 3	6AU6	270KΩ	0Ω	0Ω	.1Ω	†3.2KΩ	†3.2KΩ	82Ω		
V 4	6AU6	270KΩ	0Ω	0Ω	.1Ω	†3.2KΩ	†3.2KΩ	82Ω		
V 5	6AU6	270KΩ	0Ω	0Ω	.1Ω	†3.2KΩ	†3.2KΩ	82Ω		
V 6	6AU6	2.5Ω	0Ω	0Ω	.1Ω	†3.2KΩ	†3.2KΩ	68Ω		
V 7	6AL5	.7Ω	47KΩ	.1Ω	0Ω	1 Meg.	0Ω	8KΩ		
V 8	12AU7	†6KΩ	2.2 Meg.	560Ω	.1Ω	.1Ω	†4.5KΩ	7Ω	0Ω	0Ω
V 9	6SL7GT	0Ω	220KΩ	†3.3 Meg.	47KΩ	†270KΩ	0Ω	.1Ω	0Ω	
V 10	6AU6	730KΩ	0Ω	0Ω	.1Ω	†6KΩ	†23KΩ	68Ω		
V 11	6T8	Inf.	22KΩ	Inf.	0Ω	.1Ω	0Ω	0Ω	10 Meg.	†220KΩ
V 12	6K6GT	Inf.	0Ω	†3.6KΩ	†3KΩ	470KΩ	Inf.	.1Ω	680Ω	
V 13	6SN7GT	2.4 Meg. 2.3 Meg.	¶1.5 Meg.	0Ω	1 Meg.	¶1.4KΩ	6KΩ 1000Ω	.1Ω	0Ω	
V 14	6AL5	150KΩ	2.2 Meg.	.1Ω	0Ω	4.5 Meg.	0Ω	2.2 Meg.		
V 15	6SN7GT	150KΩ 100KΩ	†220KΩ	1.5KΩ	4.6 Meg.	†5.6KΩ	1.5KΩ	.1Ω	0Ω	
V 16	6BQ6GT	Inf.	0Ω	220KΩ	†22KΩ	470KΩ	470KΩ	.1Ω	0Ω	TOP CAP ¶48Ω
V 17	6W4GT	¶220KΩ	2 Meg.	750KΩ	3 Meg.	†38Ω	1 Meg.	.1Ω	0Ω	
V 18	1X2	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	TOP CAP ¶340Ω
V 19	5U4G	Inf.	40KΩ	470KΩ	24Ω	470KΩ	26Ω	Inf.	40KΩ	
V 20	12LP4	0Ω	2 Meg.	PIN 10 †100KΩ	PIN 11 35KΩ 7KΩ	PIN 12 .1Ω				

† MEASURED FROM PIN 8 OF V19.
¶ MEASURED FROM PIN 3 OF V17.

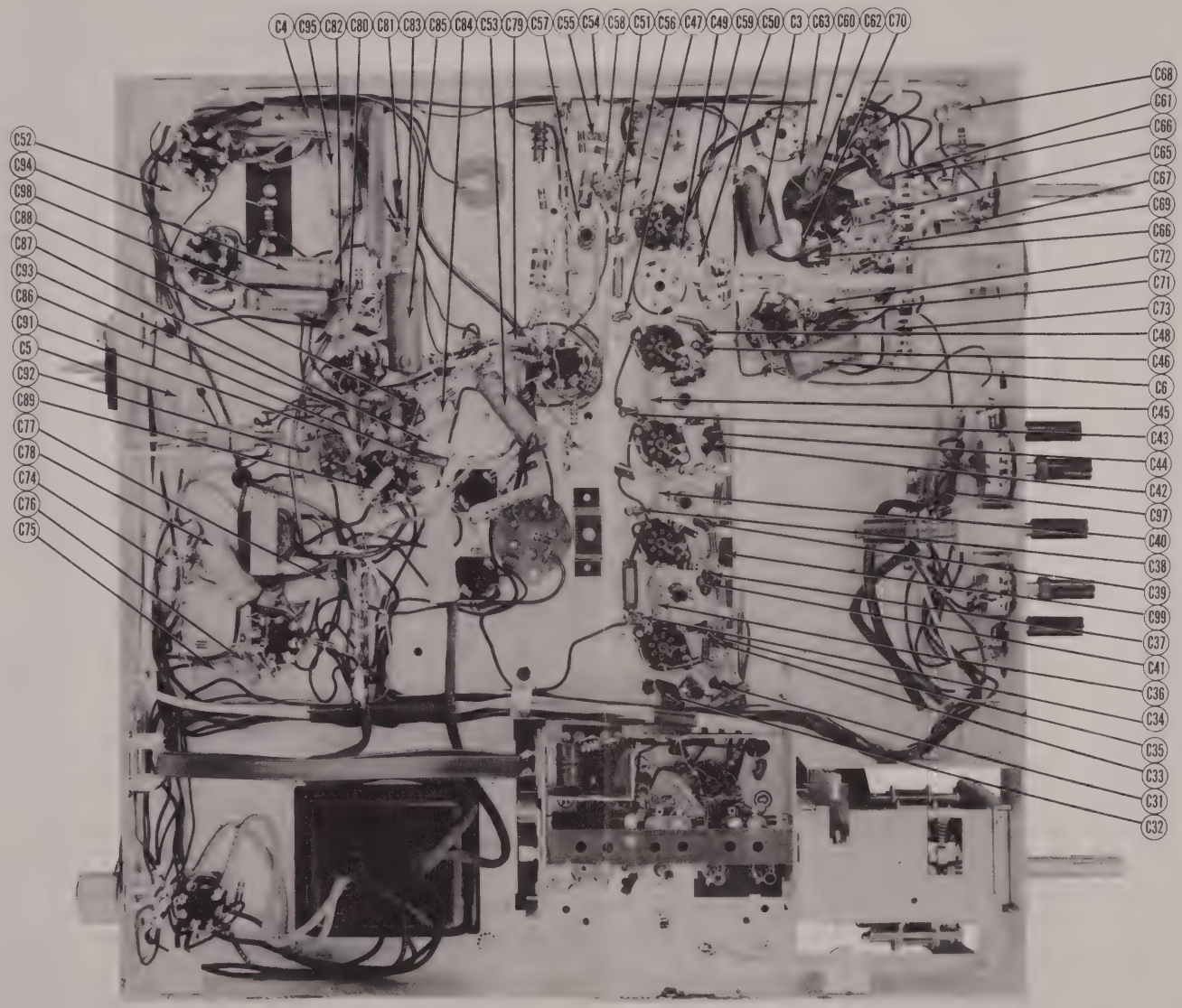
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltage measured at 1,000 ohms.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. Front panels controls set at minimum.
6. Where readings may vary according to the setting of the service controls, both minimum and maximum readings are given.



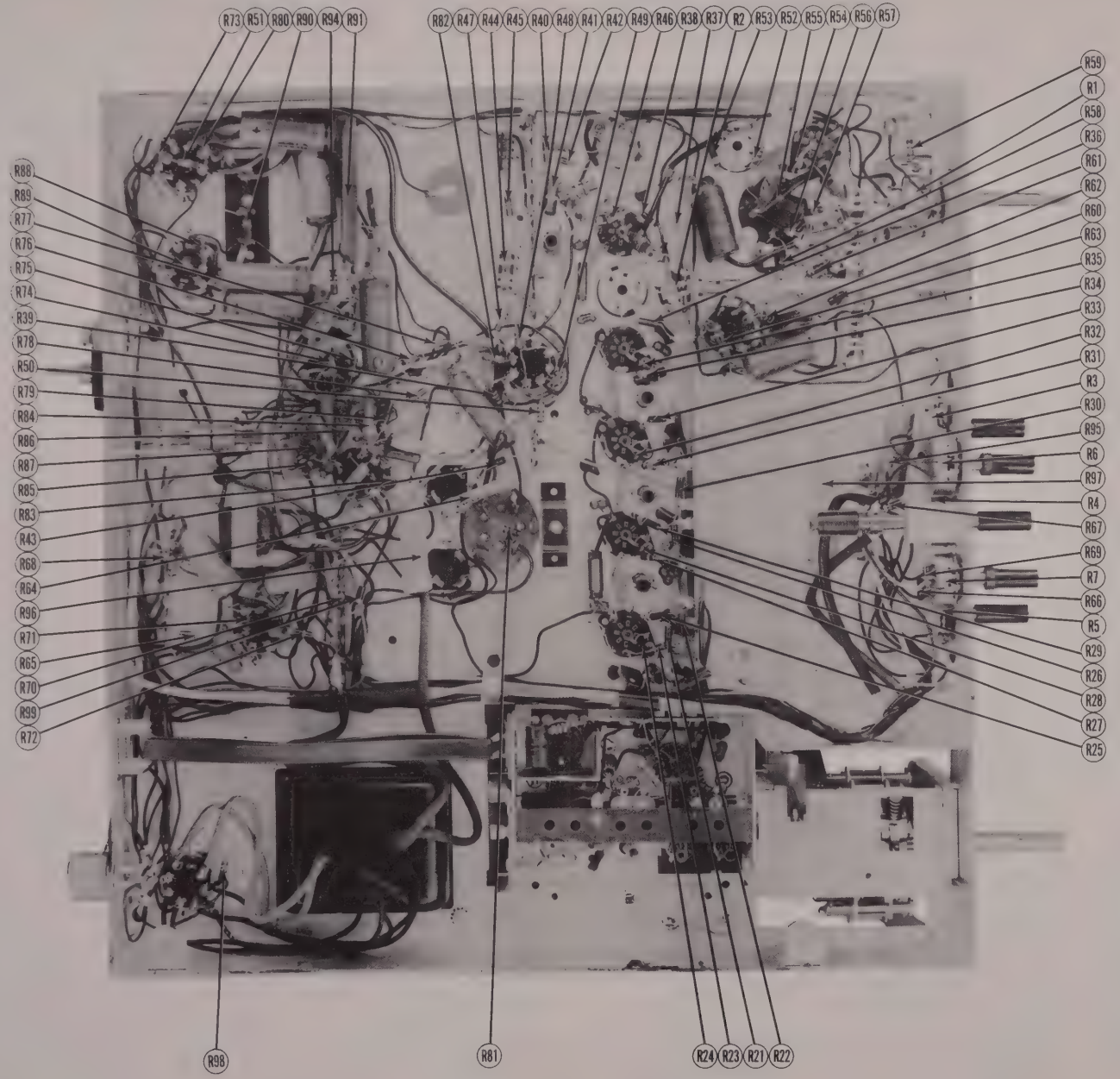
CHASSIS-TOP VIEW



CABINET-REAR VIEW



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PRODUCTION CHANGES

C1102, M1101

CODE 1 : Same as schematic diagram.

CODE 2 : R86 disconnected from junction of R96 and R97 and connected to pin 4 of accessory power plug.
C92 changed from 680MMF to 1000MMF.

CODE 3 : C90 not used.

CODE 4 : C96 connected to ground instead of terminal 1 of T3.

CODE 5 : C92 changed from 1000MMF to 680MMF and trimmer (80 - 480MMF) (Part No. A-8E-18508) connected in parallel with C92.

CODE 6 : Gimmick capacitor (.2MMF - Part No. A-50-18517) added from pin 3 of V9A to pin 5 of V17.

CODE 7 : R94, terminal 3 of T3, negative side of C4, and C95 connect to pin 6 instead of pin 4 of accessory power socket.
Horizontal output transformer (T3) changes to Part No. C-12M-18285.

CODE 8 : 1000MMF capacitor added from pin 6 of accessory power socket to ground.

CODE 9 : R66 changed in value from 100KΩ to 68KΩ.

CODE 10: 5600Ω 2 Watt resitor added from pin 4 of accessory power socket to positive side of C20 at speaker socket.
R66 changed from 68KΩ to 18KΩ (Part No. C-9B1-77).
R67 changed from 1 Meg. to 560KΩ (Part No. C-9B1-95).
R90 and M2 (fuse) removed from pin 8 of V16. Pin 8 of V16 connected to ground.
M2 (fuse) connected between pins 6 and 1 of accessory power socket, ground connection removed from pin 1. Positive side of C1B removed from pin 6 and connected to pin 1 with pin 1 being connected to R94, terminal 3 of T3, negative side of C4 and C95. The jumper plug for the accessory power socket was rewired as follows: Pin 4 disconnected from pin 5 and connected to pin 1.
R64 changed from 2700Ω 5 Watt to 5600Ω 2 Watt (Part No. C-9B4-74).
R93 (470KΩ resistor) removed from high voltage lead.
100KΩ resistor (Part No. C-9B1-86) added between arm of brightness control (R3) and Pin 11 of V20.
R95 removed, one side of brightness control (R3) grounded and a 68KΩ $\frac{1}{2}$ Watt resistor (Part No. C-9B1-84) added from other side of brightness control to junction of R96 and R97 through switch added on rear of volume - contrast control.

CODE 11: 3900Ω 2 Watt resistor (Part No. C-9B4-69) added in Parallel with C4.
Horizontal output transformer (T3) changed to Part No. C-201-18530.

CODE 12: 7MMF capacitor (Part No. C-8G-11790) added in parallel with L10.

— M701 —

M701 same as C1102, M1101 except for picture tube and does not have the accessory power sockets and plugs.

CODE 1: Same as Code 3 of C1102, M1101.

CODE 2: Same as Code 4 of C1102, M1101.

CODE 3: Same as Code 5 of C1102, M1101.

CODE 4: Same as Code 6 of C1102, M1101.

CODE 5: Same as Code 7 of C1102, M1101.

CODE 6: Same as Code 8 of C1102, M1101.

CODE 7: Same as Code 9 of C1102, M1101.

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Synchronize the picture vertically with the vertical hold control.

Set the horizontal hold "fine" control to the center of its range.

Adjust the horizontal hold "coarse" slug (B1) to the center of the range over which the picture synchronizes horizontally.

Adjust the horizontal size slug (B2) until the picture is of proper width.

DISASSEMBLY INSTRUCTIONS

1. Remove two push-on type control knobs.
2. Remove four phillips head screws holding rear cover. Remove cover.
3. Remove speaker plug.
4. Loosen two antenna terminal screw. Remove built-in antenna leads if connected.
5. Remove five screws holding chassis. Remove chassis.
6. Remove four phillips head screws holding speaker. Remove speaker.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RAYTHEON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	NOTES
V1	RF Amp.	6AG5	6AG5	7BD	
V2	Converter	6J8	6J8	7BF	
V3	1st Video IF	6AU6	6AU6	7BK	
V4	2nd Video IF	6AU6	6AU6	7BK	
V5	3rd Video IF	6AU6	6AU6	7BK	
V6	4th Video IF	6AU6	6AU6	7BK	
V7	Video Det.-DC Restorer-Sync. Sep.	6AL5	6AL5	6BT	
V8	Video Amp.	12AU7	12AU7	9A	
V9	AGC Amp.-Sync. Amp.	6SL7GT	6SL7GT	6BD	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Det.-AF Amp.	6T8	6T8	9E	
V12	Audio Output	6K8GT	6K8GT	7S	
V13	Vert. Osc.-Vert. Amp.	6SN7GT	6SN7GT	8BD	
V14	Hor. Sync. Disc.	6AL5	6AL5	6BT	
V15	Hor. Multivib.	6SN7GT	6SN7GT	8BD	
V16	Hor. Output	6BQ6	6BQ6	6AM	
V17	Damper	6W4GT	6W4GT	4CG	
V18	HV Rectifier	1X3	1X3	7CB	
V19	LV Rectifier	5U4G	5U4G	5T	
V20A	Picture Tube	12LP4	12LP4	12D	Used in models C1102, M1101
B	Picture Tube	10BP4	10BP4	12D	Used in model M701

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	30	450	A-8C-17845	AF6102J			D13051	▲ Filter
B	60	450						■ Filter
C	10	450						▲ Filter
C1A	30	450	A-8C-17844	AF66J2525A			D13050	▲ Filter
B	135	25						■ Vert. Output Cath. Bypass
C	135	25						▲ Video Amp. Cath. Bypass
D	30	450						Output Decoupling
C3	10	50	A-8C-17183	PRS50/10			TVA-14	Stabilizing Cap.
C4	10	150	A-8C-11495	PRS150/12			UT-101	Decoupling
C5	8	450	A-8C-13453	PRS450/8			TVA-21	Vert. Osc. Decoupling
C6	10	50	A-8C-17183	PRS50/10			TVA-14	Output Cathode Bypass
C7	220		C-8G-16045	GP220M	D6-221	GP2K-220		RF Coupling
C8	5000		A-8G-13962	BPD-5	D6-502	811-005	29C1	RF Cathode Bypass
C9	1000		C-8G-13201	GP1000M	D6-102	GP2L-001		RF Screen Bypass
C10	.5		A-8G-12495-7		D2-.5			RF Coupling
C11	12		C-8G-17305	C1I2JNPO	D2-12	NPOK-12		Fixed Trimmer
C12	1000		C-8G-13201	GP1000M	D6-102	GP2L-001		Fixed Trimmer
C13	4		C-8G- 11893	CMCNPO		NPOK-4		Fixed Trimmer
C14	1000		C-8G-13201	GP1000M	D6-102	GP2L-001		Fixed Trimmer
C15	.5		A-8G-12495-7		D2-.5			RF Coupling
C16	1.5		A-8G-12495-3	C1L.5CNPO	D2-1.5	NPOK-1.5		RF Coupling
C17	1000		C-8G-13201	GP1000M	D6-102	GP2L-001		RF Bypass
C18	2.2		A-8G-12495-4		D2-2.2			Osc. Coupling
C19	2.2		A-8G-12495-4		D2-2.2			Osc. Coupling
C20	51		C-8G-11891	GP51K	D6-500	GP1K-50		Osc. Feedback
C21	7		C-8G-15224	C1TDN750		N750K-7		Fixed Trimmer
C22	51		C-8G-11891	GP51K	D6-500	GP1K-50		Osc. Grid Cap.
C23	7		C-8G-15224	C1TDN750		N750K-7		Fixed Trimmer
C24	51		C-8G-11891	CN51JN750	DN-51	N750L-51		Fixed Padder
C25	2.5		C-8G-15737					Osc. Feedback
C26	51		C-8G-11891	GP51M	D6-500	GP1K-50		Conv. Cathode Bypass
C27	1000		C-8G-13201	GP1000M	D6-102	GP2L-001		RF Bypass
C28	220		C-8G-16045	GP220M	D6-221	GP2K-220		RF Filament Bypass
C29	220		C-8G-16045	GP220M	D6-221	GP2K-220		Osc. Filament Bypass
C30	220		C-8G-16045	GP220M	D6-221	GP2K-220		Osc. Filament Bypass
C31	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	Conv. Plate Decoupling
C32	100	500	C-8F3-8	1468-0001	D6-101	GP1K-100	1FM-31	IF Coupling
C33	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C34	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	1st Video IF Filament Bypass
C35	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	1st Video IF Decoupling
C36	47	500	C-8F3 109	1468-00005	D6-470	GP1K-47	1FM-45	IF Coupling
C37	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C38	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	2nd Video IF Filament Bypass
C39	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	2nd Video IF Decoupling
C40	47	500	C-8F3-109	1468-00005	D6-470	GP1K-47	1FM-45	IF Coupling
C41	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C42	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	AGC Filter
C43	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	3rd Video IF Filament Bypass
C44	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	3rd Video IF Decoupling
C45	47	500	C-8F3-109	1468-00005	D6-470	GP1K-47	1FM-45	IF Coupling
C46	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	4th Video IF Cathode Bypass
C47	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	4th Video IF Filament Bypass
C48	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	4th Video IF Decoupling
C49	5		C-8G-12166	GP5K	D2-4.7	NPOK-5	MS-55	Video Diode Filter
C50	22		C-8G-13909	GP22K	D6-220	GP1K-22	MS-425	Peaking
C51	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	Video Det.-DC Rest. Fil. Bypass
C52	1000	500	C-8G-13201	1468-001	D6-102	GP2L-001	1FM-21	Horiz. Sweep Coupling
C53	.1	200	C-8D-10771	P288-1			TM-1	AGC Filter
C54	.02	400	C-8D-17607	P488-02			TM-12	Video Coupling
C55	1000		C-8G-13201	GP1000M	D6-102	GP2L-001	1FM-21	Video Output Cathode Bypass
C56	.01	400	C-8D-17270	P488-01	D6-103	821-01	TM-11	Video Coupling
C57	22			GP22K	D6-220	GP1K-22		Fixed Trimmer
C58	.01	400	C-8D-17270	P488-01	D6-103	821-01	TM-11	Video Coupling
C59	3.3		A-8G-12495-5	C1J.3CNPO	D2-3.3	NPOK-3.3		Sound IF Coupling
C60	5000		A-8G-13962	BPD-5	D6-502	811-005	29C1	AGC Filter
C61	5000		A-8G-13962	BPD-5	D6-502	811-005	29C1	Sound IF Cathode Bypass
C62	5000		A-8G-13962	BPD-5	D6-502	811-005	29C1	Sound IF Screen Bypass

CAPACITORS (CONT.)

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RAYTHEON PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C63	.004	400	C-8D-17958	P688-004	D6-472	811-005	TM-24	Sound IF Decoupling
C64	470	500	C-8F3-12	1468-0005	D6-471	GP2K-470	1FM-35	Diode Load Cap.
C65	470	500	C-8F3-12	1468-0005	D6-471	GP2K-470	1FM-35	De-emphasis
C66	4.7		C-8G-13877	CN4.7DNPO	D2-4.7	NPOK-4.7	MS-55	Balancing
C67	.01	200	C-8D-17258	P488-01	D6-103	821-01	TM-11	Audio Coupling
C68	.02	200	C-8D-17807	P488-02			TM-12	Tone Compensation
C69	.01	200	C-8D-17258	P488-01	D6-103	821-01	TM-11	Audio Coupling
C70	5000		A-8G-13962	BPD-5	D6-502	811-005	29C1	RF Bypass
C71	220	500	C-8F3-10	1468-00025	D6-221	GP2K-220	1FM-325	AF Plate Bypass
C72	.01	400	C-8D-17270	P488-01	D6-103	821-01	TM-11	Audio Coupling
C73	.01	400	C-8D-17270	P488-01	D6-103	821-01	TM-11	Output Plate Bypass
C74	.01	400	C-8D-17270	P488-01	D6-103	821-01	TM-11	Integrator Network
C75	6800	500	C-8F9-19	1467-007	D6-682	GP2-334-0068	1FM-27	Vert. Osc. Grid Cap.
C76	220	500	C-8F3-117	1468-00025	D6-221	GP2K-220	1FM-325	Vert. Osc. Grid Bypass
C77	.05	400	C-8D-14461	P488-05			TM-15	Vert. Discharge
C78	.25	400	C-8D-17784	P488-25			TC-2	Vert. Sweep Coupling
C79	75	500	C-8F3-222	1469-000075	D2-75	GP1K-75	1FM-475	Horiz. Sync. Coupling
C80	220	500	C-8F3-117	1468-00025	D6-221	GP2K-220	1FM-325	Horiz. Sweep Feedback
C81	220	500	C-8F3-117	1468-00025	D6-221	GP2K-220	1FM-325	Horiz. Sweep Feedback
C82	680	500	C-8F3-123		D6-681	GP2K-680	1FM-37	Voltage Divider
C83	680	500	C-8F3-123		D6-681	GP2K-680	1FM-37	Voltage Divider
C84	.1	200	C-8D-17259	P288-1			TM-1	AFC Filter
C85	.25	200	C-8D-10775	P488-25			TC-2	AFC Filter
C86	100	500	C-8F3-113	1468-0001	D6-101	GP1K-100	1FM-31	RF Bypass
C87	.005	200	C-8D-17785	P688-005	D6-502	811-005	TM-25	Horiz. MV Grid Cap.
C88	3900	500	C-8F11-132					Fixed Trimmer
C89	220	500	C-8F3-117	1468-00025	D6-221	GP2K-220	1FM-325	Horiz. MV Feedback
C90	47	500	C-8F3-109	1468-00005	D6-470	GP1K-47	1FM-45	Horiz. MV Grid Cap. *
C91	220	500	C-8F3-117	1468-00025	D6-221	GP2K-220	1FM-325	Horiz. Discharge
C92	1000	500	C-8F3-123	1467-001	D6-102	GP2L-001	1FM-21	Horiz. Discharge †
C93	.001	600	C-8D-10787	P688-001	D6-102	GP2L-001	TM-21	Horiz. Sweep Coupling
C94	.1	400	C-8D-10760	P488-1			TM-1	Horiz. Output Screen Bypass
C95	.5	200	C-8D-17260	P288-5			TC-5	Horiz. Sweep Coupling
C96	500	15K	A-8C-17179					HV Filter
C97	.1	400	C-8D-10760	P488-1			TM-1	Picture Tube Cathode Decoupling
C98	.05	400	C-8D-10813	P488 05			TM-15	Acc. Anode Bypass
C99	5000		A-8G-13962	BPD-5	D6-502	811-005	29C1	RF Bypass

* Not used in all models.
† Some models use 680MMF in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAYTHEON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1	1 Meg.	½	A-10A-17215				Volume control & switch, tapped @ 100KΩ
R2	8000Ω	½	A-10B-17316				Contrast control
R3A	50KΩ	½	A-10B-17764	Q11-123	AM-44 S	N-227	Brightness control
B	Shaft		Not Req.	Not Req.	KSS-3	K-185	Attach to R3A per instructions
R4	100KΩ	½	A-10B-17275	Q11-128	15/16-49-S	B-40	Vert. hold control
R5	50KΩ	½	A-10B-17764	Q11-123	15/16-44-S	B-31	Horiz. hold control
R6	50000Ω	½	A-10B-17786	Q11-114	M-19-S	B-10	Vert. linearity control
R7	2 Meg.	½	A-10B-17318	Q11-139	M-83-S	B-75	Vert. size control-See note 1

Note 1. Some models use 750KΩ control. Part No. A-10B-18240.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAYTHEON PART No.	IRC PART No.	IDENTIFICATION CODES: ALL RESISTORS ARE ± 10% UNLESS OTHERWISE STATED.
R8	470KΩ 5%	½			Ant. Isolation
R9	470KΩ 5%	½			Ant. Isolation
R10	680Ω	½	C-9B1-60		Ant. Transformer Shunt
R11	100KΩ	½	C-9B1-86	BTS-100K	RF Grid
R12	68Ω	½	C-9B1-48		RF Cathode
R13	1000Ω 20%	½	C-9B1-13	BTS-1000	RF Screen Decoupling
R14	5600Ω	½	C-9B1-71	BTS-5600	Conv. Grid Coil Shunt
R15	10KΩ	½	C-9B1-74		Conv. Grid
R16	220Ω	½	C-9B1-54		Conv. Cathode
R17	10KΩ	½	C-9B1-74		Osc. Grid
R18	5600Ω	½	C-9B1-71	BTS-5600	Osc. Plate
R19	10Ω	½	C-9B1-38		Parasitic Supp.
R20	10Ω	½	C-9B1 38		Parasitic Supp.
R21	1000Ω 20%	½	C-9B1-62	BTS-1000	Conv. Plate Decoupling
R22	1000Ω 20%	½	C-9B1-62	BTS-1000	AGC Network
R23	8200Ω	½	C-9B1-73		1st Video IF Grid
R24	82Ω	½	C-9B1 49		1st Video IF Cathode
R25	1000Ω 20%	½	C-9B1-62	BTS-1000	1st Video IF Decoupling
R26	1000Ω 20%	½	C-9B1-62	BTS-1000	AGC Network
R27	4700Ω	½	C-9B1-70		2nd Video IF Grid
R28	82Ω	½	C-9B1-49		2nd Video IF Cathode
R29	1000Ω 20%	½	C-9B1-62	BTS-1000	2nd Video IF Decoupling
R30	1000Ω 20%	½	C-9B1 62	BTS-1000	AGC Network
R31	8200Ω	½	C-9B1-73	BTS-8200	3rd Video IF Grid
R32	82Ω	½	C-9B1-49		3rd Video IF Cathode
R33	1000Ω 20%	½	C-9B1-62	BTS-1000	3rd Video IF Decoupling
R34	4700Ω	½	C-9B1-70		4th Video IF Coil Shunt
R35	68Ω	½	C-9B1-48		4th Video IF Cathode
R36	1000Ω 20%	½	C-9B1-62	BTS-1000	4th Video IF Decoupling
R37	47KΩ	½	C-9B1-82	BTS-47K	AGC Network
R38	1 Meg.	½	C-9B1-98	BTS-1 Meg.	DC Rest. Load-See Note 2
R39	47KΩ	½	C-9B1-82	BTS-47K	Sync. Amp. Grid
R40	1000Ω	½	C-9B1-13	BTS-1000	Peaking Coil Shunt
R41	2200Ω	1	C-9B2-66	BTA-2200	Video Amp. Plate
R42	2.2 Meg.	½	C-9B1-102	BTS-2.2 Meg.	Video Amp. Grid
R43	560Ω	½	C-9B1-59	BTS-560	Video Amp. Cathode
R44	4700Ω	2	C-9B4-70	BT-2-4700	Video Amp. Plate
R45	10KΩ	½	C-9B4-74	BTS-10K	Isolation
R46	1 Meg.	½	C-9B4-98	BTS-1 Meg.	Picture Tube Grid
R47	270KΩ	½	C-9B4-91	BTS-270K	Sync. Amp. Plate

RESISTORS (CONT.)

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RAYTHEON PART No.	IRC PART No.	IDENTIFICATION CODES
R48	3.3 Meg.	½	C-9B1-34	BTS-3.3 Meg.	Voltage Divider
R49	220KΩ	½	C-9B1-90	BTS-220K	AGC Amp. Plate Load
R50	47KΩ	½	C-9B1-82	BTS-47K	AGC Network
R51	560KΩ	½	C-9B1-95	BTS-560K	Feedback
R52	470KΩ 20%	½	C-9B1-94	BTS-470K	AGC Network
R53	220KΩ	½	C 9B1-90		Sound IF Transformer Shunt
R54	68Ω	½	C-9B1-48		Sound IF Cathode
R55	22KΩ	½	C-9B1-78		Sound IF Screen
R56	4700Ω	½	C-9B1-70		Sound IF Decoupling
R57	10KΩ	½	C-9B1-74	BTS-10K	De-emphasis
R58	22KΩ	½	C-9B1-78	BTS-22K	Ratio Det. Diode Load
R59	47KΩ	½	C-9B1-82	BTS-47K	Tone Compensation
R60	10 Meg. 20%	½	C-9B1-37	BTS-10 Meg.	AF Grid
R61	220KΩ	½	C-9B1-90	BTS-220K	AF Plate
R62	470KΩ 20%	½	C-9B1-94	BTS-470K	Output Grid
R63	680Ω	1		BTA-680	Output Cathode-See Note 3
R64	2700Ω	5	C-9C12-1104		Output Decoupling-Wire Wound
R65	2.2 Meg.	½	C-9B1-102	BTS-2.2 Meg.	Vert. Osc. Grid
R66	100KΩ	½	C-9B1-86	BTS-100K	Voltage Divider
R67	1 Meg.	½	C-9B1-98	BTS-1 Meg.	Voltage Divider
R68	220KΩ	½	C-9B1-90	BTS-220K	Vert. Osc. Plate
R69	1 Meg.	½	C-9B1-98	BTS-1 Meg.	Vert. Size Control Shunt-See Note 4
R70	3900Ω	½	C-9B1 69	BTS-3900	Vert. Peaking
R71	1 Meg.	½	C-9B1-98	BTS-1 Meg.	Vert. Amp. Grid
R72	1000Ω	½	C-9B1-13	BTS-1000	Vert. Amp. Cathode
R73	220KΩ	½	C 9B1-90	BTS-220K	Voltage Divider
R74	150KΩ	½	C-9B1-88	BTS-150K	Horiz. Sync. Disc. Load
R75	2.2 Meg.	½	C-9B1-102	BTS-2.2 Meg.	Horiz. Sync. Disc. Load
R76	150KΩ	½	C-9B1-88	BTS-150K	Horiz. Sync. Disc. Load
R77	2.2 Meg.	½	C-9B1-102	BTS-2.2 Meg.	Horiz. AFC Filter Network
R78	33KΩ	½	C-9B1-80	BTS-33K	Horiz. AFC Filter Network
R79	220KΩ	½	C-9B1-90	BTS-220K	Horiz. MV Grid
R80	1 Meg.	½	C-9B1-98	BTS-1 Meg.	Feedback
R81	1.5 Meg.	½	C-9B1-32	BTS-1.5 Meg.	Feedback
R82	56KΩ	½	C-9B1-83	BTS-56K	Integrator
R83	1500Ω	½	C-9B1-64	BTS-1500	Horiz. MV Cathode
R84	5600Ω	1	C-9B2-71	BTA-5600	Horiz. MV Plate
R85	100KΩ	½	C-9B1-86	BTS-100K	Horiz. MV Grid
R86	220KΩ	½	C-9B1-90	BTS-220K	Horiz. MV Plate-See Note 5
R87	4700Ω	½	C-9B1-70	BTS-4700	Horiz. Peaking-See Note 2
R88	220Ω	½	C-9B1-54		Parasitic Supp.
R89	470KΩ	½	C-9B1-94	BTS-470K	Horiz. Output Grid
R90	100KΩ	½	C-9B1-86	BTS-100K	Horiz. Output Cathode
R91	22KΩ	5	C-9C12-1115	AB-22, 500	Horiz. Output Screen-Wire Wound
R92	1 Meg.	1	C-9B2-98	BTA-1 Meg.	Feedback
R93	470KΩ	½	C-9B1-94		HV Filter
R94	100KΩ	½	C-9B1-86	BTS-100K	Acc. Anode Decoupling
R95	6800Ω	½	C-9B1-72	BTS-6800	Voltage Divider
R96	1000Ω	10	C-9C14-1099	AB-1000	Filter-Wire Wound
R97	1000Ω	10	C-9C14-1099	AB-1000	Filter-Wire Wound
R98	470KΩ	½	C-9B1-94	BTS-470K	Line Filter
R99	2200Ω	2	C-9B1-66	BTS-2200	Vert. Output Transformer Shunt

Note 2. Some models use 10KΩ resistor in this application.
Note 3. Some models use 560Ω, 1 watt resistor in this application.
Note 4. Not used in all models.
Note 5. Some models use 270KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.
T1	117VAC	700 VCT	5VAC	6.3VAC	C-12A-17822	P-8153 ①	P-3059	TP-355
	② 1.9A	.240ADC	② 2A	② 6.7A		and P-5014 ②		

① Drill new mounting holes.
② Mount filament transformer above chassis.

TRANSFORMER (SWEEP CIRCUITS)

ITEM No.	RATING: DC RESISTANCE PRI.	RATING: DC RESISTANCE SEC.	REPLACEMENT DATA: RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	NOTES
T2	170Ω	1000Ω	B-12M-18241	A-8111③	A-3000 ③	TBO-1 ③	Vert. Block Osc. Trans.
T3	355Ω	3.1Ω Tap ② .2Ω	C-2M-17967				Hor. Output Trans.
	47Ω	SEC. 2 0Ω					
T4	1400Ω	8Ω	B-12C-17303	A-8112	A-3036	TSO-5	Vert. Output Trans.
T5A	13.5Ω		B-13M-13590	DY-1	MD-1		Hor. Deflection Coil
B	82Ω						Vert. Deflection Coil

③ Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
T6	7.5KΩ	3.5Ω	450Ω	.4Ω	Part of SPKR	A-8114	A-2931	RO-13	

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA RAYTHEON PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	V. C. IMP.		ST-108 ④		④ Remount output transformer
SP1A	PM	3.5Ω	C-18A-18022 ⑤	MOD. P6-X	6A1 ④	⑤ Used in model M-1101.
B	PM		C-18A-18157 ⑥	ST-119 ⑦ MOD. P10-T	10A31 . ⑥	⑥ Used in model C-1102. ⑦ Replace output transformer to match 6-8Ω voice coil.
C	PM		C-18A-18176 ⑧	ST-107 ④ MOD. P5-V	5A07 ④	⑧ Used in model M-701.
	CONE DIA.	V. C. DIA.				
SP2A	6"	9/16"	⑤			
B			⑥			
C			⑧			

FILTER CHOKE

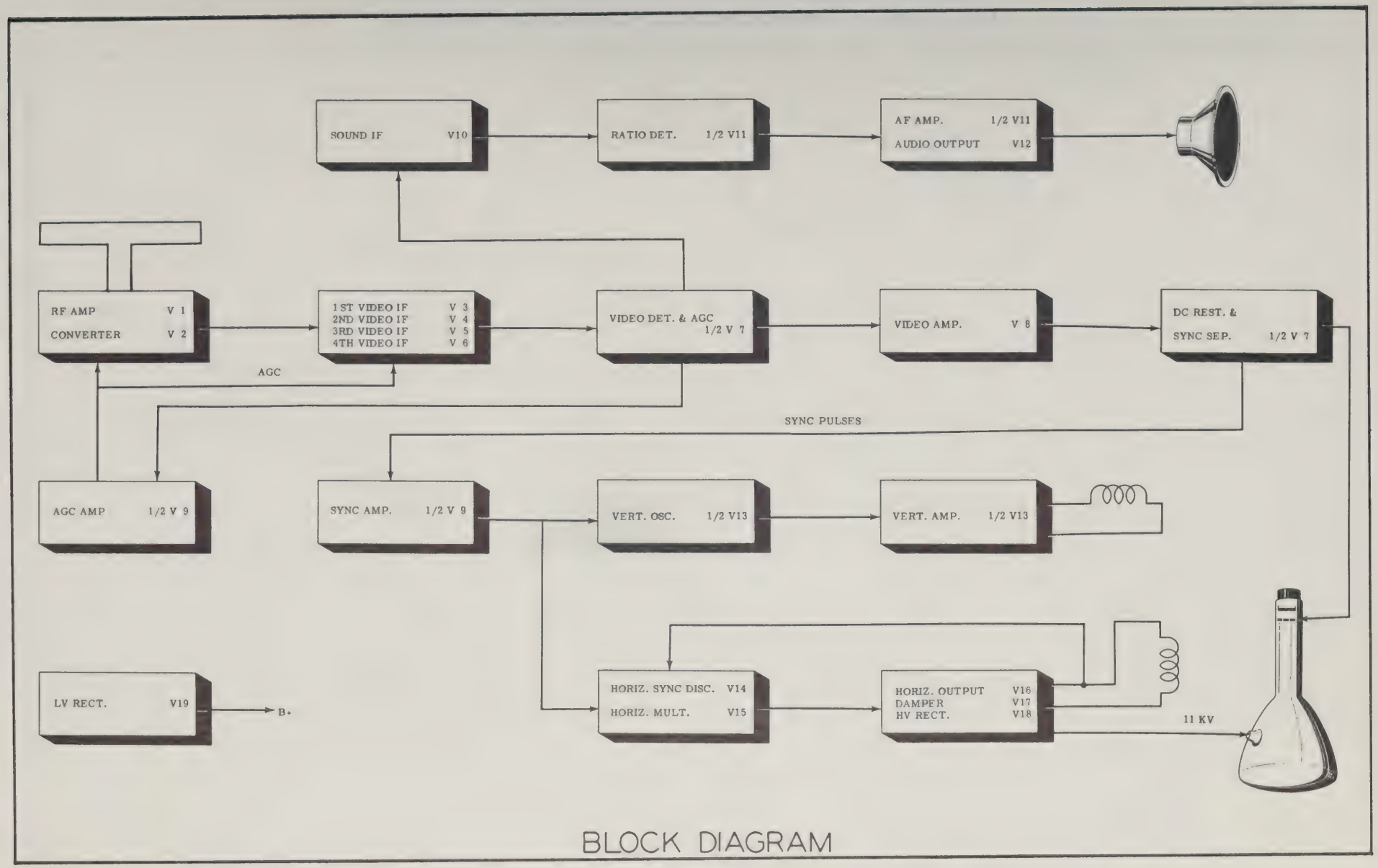
ITEM No.	RATINGS TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∽)	REPLACEMENT DATA RAYTHEON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	INSTALLATION NOTES
L1	.240A	35Ω	1.4 Henries	B-16A-17959	C-2326 ①	C-2991 ①	TR-3300 ①	① Drill one new mounting hole.

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA RAYTHEON PART No.	MEISSNER PART No.	NOTES
L2A	Ant. Coil	0Ω				High-Band } Includes two 5-20MMF trimmer and
B	Ant. Coil	0Ω		B-201-17143		Low-Band } two 470KΩ resistors.
L3	RF Choke	1Ω		A-16A-17128		
L4	RF Coil Pri.	0Ω		B-13E-17140		High-Band
L5	RF Coil Sec.	0Ω		B-13E-17140		High-Band
L6	Osc. Coil	0Ω		B-13E-17140		High-Band
L7	RF Coil Pri.	0Ω		B-13E-12046		Low-Band
L8	RF Coil Sec.	0Ω		B-13E-12046		Low-Band
L9	Osc. Coil	0Ω		B-13D-12155		Low-Band
L10	RF Choke	10Ω		A-16A-18025		
L11	1st Video IF	.5Ω		A-13M-18026		
L12	Fil. Choke	.2Ω		A-201-15609		
L13	2nd Video IF	.2Ω		B-201-15612		
L14	3rd Video IF	.2Ω		B-201-15612		
L15	4th Video IF	.2Ω		B-201-15612		
L16	RF Choke	2.5Ω		A-201-15608		
L17	5th Video IF	.5Ω	.7Ω	B-13B-17956		
L18	Fil. Choke	1.2Ω		A-16A-17937		
L19	Peaking	11Ω		A-16A-17048		
L20	Peaking	15Ω		A-16A-17961		
L21	Peaking	15Ω		A-16A-17961		
L22	4.5 MC Trap	2.6Ω		A-201-17962		
L23	Sound Take-Off	2Ω				
L24	Ratio Det. Trans.	4.5Ω		B-13M-17273		
L25	Horiz. Hold	65Ω		A-13D-16943		Coarse control
L26	Width Cont.	.2Ω		A-18M-18233		

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M1	RF Tuner		
M2	Fuse	A-55F-18033	.25A, 250V
M3	Ion Trap	B-16M-17982	Permanent Magnet
M4A	Focus Magnet	B-55P-18185	Permanent Magnet
B	Focus Magnet	B-55P-18282	Permanent Magnet
	Iron Core	A-51A-15715	L7
	Iron Core	A-51A-17162	L6
	Iron Core	A-51A-17161	L8
	Iron Core	A-51A-17513	L4, L6, L9
	Iron Core	A-51A-17966	L13, L14, L15, L22
	Iron Core	A-51A-16945	L25, L26
	Cabinet	R-24D-18050	M-1101
	Cabinet	[illegible]-24D-18066	C-1102
	Cabinet	[illegible]-24D-18206	M-701
	Safety Glass	B-[illegible]0M-17729	
	Knob	B-5B 17763-68	Tuning
	Knob	B-5B-17761-68	On-Off Volume
	Knob	B-5B-17762-68	Contrast



BLOCK DIAGRAM

SILVERTONE MODEL 9280 (Ch. 528.168) (BATTERY-LINE OPERATED)

SILVERTONE MODEL 9280 (Ch. 528.168) (BATTERY-LINE OPERATED)

SILVERTONE MODEL 9280 (Ch. 528.168) (BATTERY-LINE OPERATED)

SILVERTONE MODEL 9280

TRADE NAME	Silvertone, Model 9280 (Ch. 528.168)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Illinois
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 1U4 RF Amp., 1R5 Converter, 1U4 IF Amp., 1U5 DET-AVC-AF, 3V4 Power Output
POWER SUPPLY	110-120 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	.14 Amp. @ 117 Volts AC or 50MA @ 9 Volts DC and 1.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning gang fully closed and set the pointer to the last calibration mark on the low frequency end of the dial backplate.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (Grid) of 1R5 (V2). Low side to B-.	455KC (400 ∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1610KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC	Tune for max. output.	"	A6, A7	"

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PARTS LIST AND DESCRIPTIONS

SILVERTONE
MODEL 9280

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SILVERTONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	RF Amp.	1U4	1U4	6AR	
V2	Converter	1R5	1R5	7AT	
V3	IF Amp.	1U4	1U4	6AR	
V4	DET. -AVC-AF	1U5	1U5	6BW	
V5	Power Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA: SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	T18-196	AF106D40A				▲ Filter
B	30	150						■ Filter
C	200	25						▲ Filament Bypass
C2	.05	200	T16-152	P288-05			TM-15	Isolation
C3	.05	400	T16-179	P488-05			72P51	Line Isolation
C4	10	500	T15-186	1468-00001	D6-100	GP1K-10	MS-41	Osc. Grid Cap.
C5	.02	400	T16-150	P488-02			TM-12	Osc. Anode Decoupling
C6	.005	600	T16-153	P688-005	D6-502	811-005	TM-25	IF Grid Filter
C7	.1	200	T16-157	P288-1			TM-1	IF Filament Bypass
C8	.1	200	T16-157	P288-1			TM-1	IF Filament Bypass
C9	.05	200	T16-152	P288-05			TM-15	AVC Filter
C10	100	500	T15-188	1468-0001	D6-101	GP1K-100	1FM-31	Diode RF Filter
C11	.005	600	T16-153	P688-005	D6-502	811-005	TM-25	Audio Coupling
C12A	50		†	GP50M	D6-500	GP1K-50	1FM-45	AF Amp. Plate Bypass
B	5000			BPD-5	D6-502	811-005	TM-25	AF Amp. Screen Bypass
C	5000			BPD-5	D6-502	811-005	TM-25	Audio Coupling
C13	.005	600	T16-153	P688-005	D6-502	811-005	TM-25	Output Plate Bypass
C14	.05	400	T16-179	P488-05			TM-15	Line Filter

† Items C12A, C12B, C12C, R13A, R13B, R13C are combined into one unit obtainable under MFGR'S Part No. T17-100.

CONTROLS

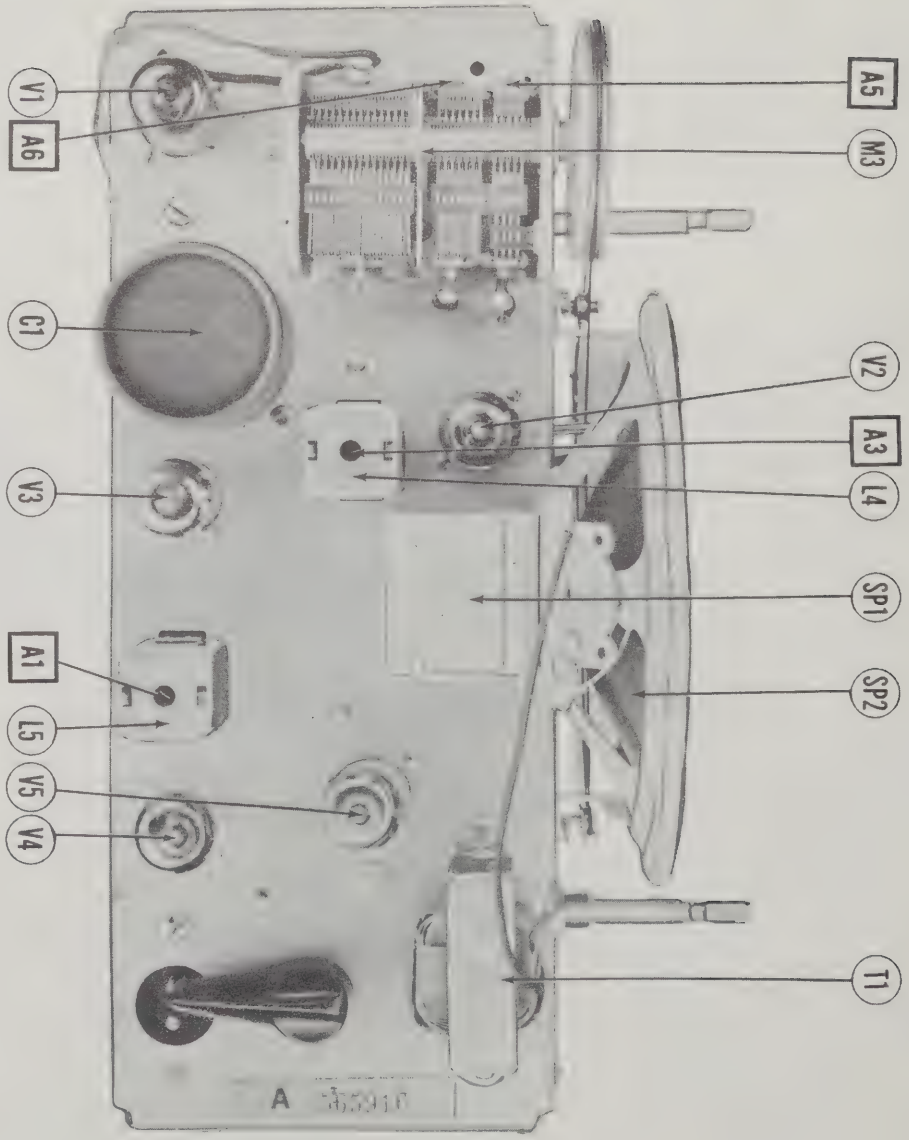
ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	1 Meg.	½	T-24-185	Q13-137	AM-63-Z	BSK-70-S	Volume control
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Attach to R1A per instructions
C	Switch		Not Req.	76-2	SW-A2	Not Req.	Attach to R1A per instructions

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA: SILVERTONE PART No.	IRC PART No.	IDENTIFICATION CODES
R2	4.7 Meg.	½	T60-669	BTS-4.7 Meg.	RF Grid
R3	22KΩ	½	T60-744	BTS-22K	RF Plate
R4	1500Ω	½	T60-729	BTS-1500	Filament String
R5	680Ω	½	T60-708	BTS-680	Filament String
R6	100KΩ	½	T60-727	BTS-100K	Osc. Grid
R7	30KΩ	½	T60-676	BTS-33K	Osc. Anode Decoupling
R8	10 Meg.	½	T60-728	BTS-10 Meg.	IF Grid
R9	470Ω	½	T60-770	BTS-470	Filament String
R10	2.2 Meg.	½	T60-726	BTS-2.2 Meg.	AVC Network
R11	47KΩ	½	T60-730	BTS-47K	Diode Filter
R12	10 Meg.	½	T60-728	BTS-10 Meg.	AF Amp. Grid
R13A	4.7 Meg.	½		BTS-4.7 Meg.	AF Amp. Screen
B	1 Meg.	½	†	BTS-1 Meg.	AF Amp. Plate
C	2.2 Meg.	½		BTS-2.2 Meg.	Output Grid
R14	330Ω	½	T60-704	BW-½-330	Filament String
R15	2000Ω	10	T60-757	AB-2000	Filament Dropping-Wire Wound
R16	1500Ω	½	T60-729	BTS-1500	Filter
R17	110Ω	3	T60-796		Surge Limiter-Wire Wound

† Items C12A, C12B, C12C, R13A, R13B and R13C are combined into one unit, obtainable under MFGR'S Part No. T17-100.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	9KΩ	3.6Ω	700Ω	.6Ω	T80-228	A-3879	A-2932	RO-16	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.				
SP1	PM	3.6Ω	T79-378		5A07 *	* Use universal mounting bracket provided.
	CONE DIA.	V. C. DIA.				
SP2	4 3/4"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	SILVERTONE PART No.	MEISSNER PART No.
L1	Loop Ant.	1.5Ω		T82-65	
L2	RF Coil	12.8Ω	11Ω	T10-535	
L3	Osc. Coil	7.5Ω	14.2Ω	T10-553	14-1074
L4	1st IF	21Ω	21Ω	T10-475	16-6668
L5	2nd IF	21Ω	21Ω	T10-475	16-6669

SELENIUM RECTIFIER

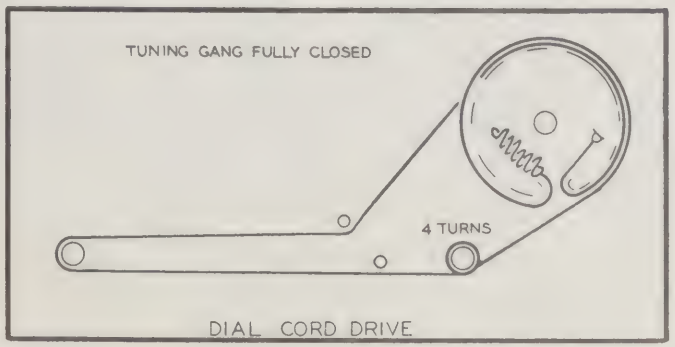
ITEM No.	RATING	REPLACEMENT DATA			NOTES
	CURRENT	SILVERTONE PART No.	SYLVANIA PART No.		
M1	.065A	T83-642	NB5		

BATTERIES

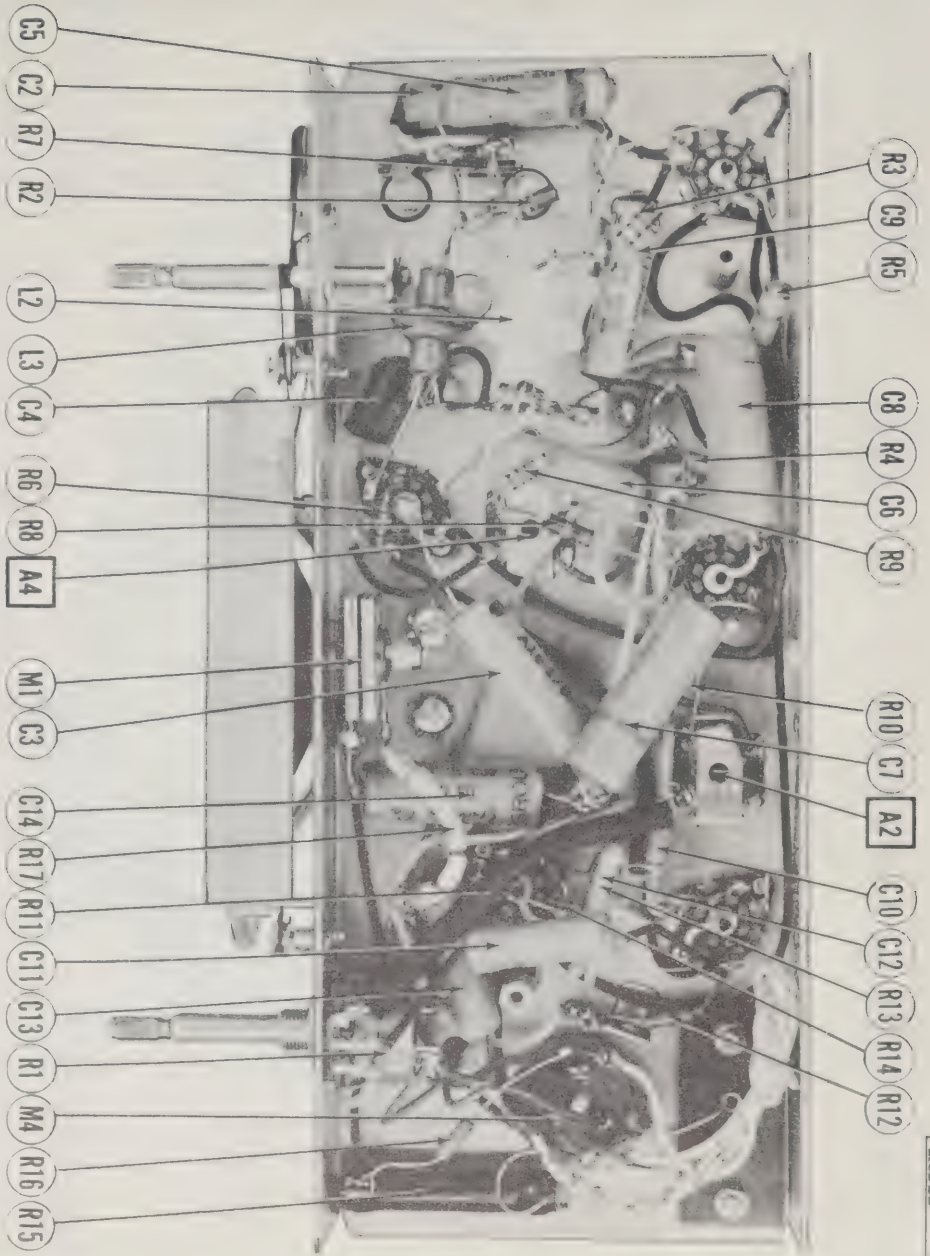
ITEM No.	VOLTAGE	SILVERTONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	9V "A" 90V "B"	6404			754			G6M60	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	3 Gang Var. Cap.	T19-207	(19-481MMF, 12-244MMF, 10-87MMF)
M4	Switch	T69-173	AC/DC-Battery
	Dial Scale	T67-549	
	Knob	T31-157	
	Dial Pointer	T58-77	
	Cabinet	T42-463	



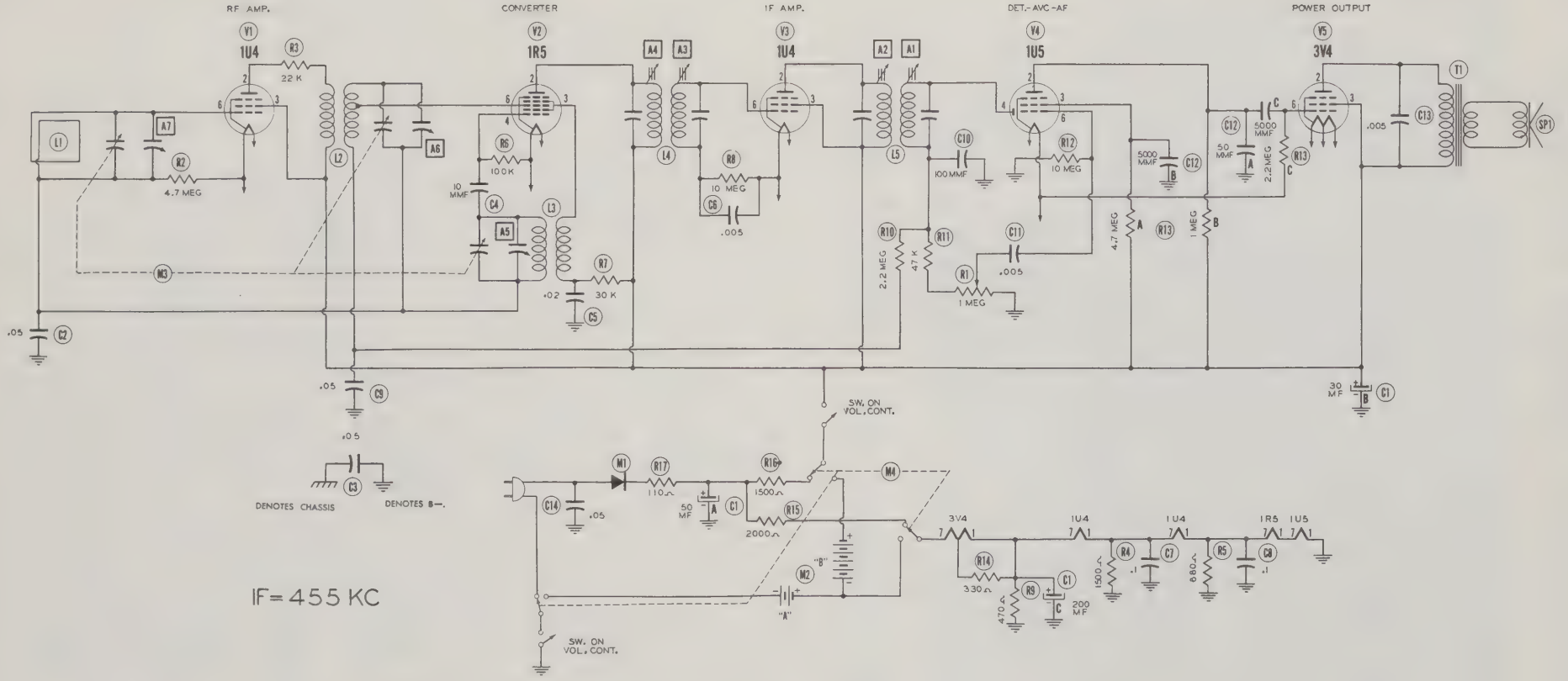
CHASSIS—BOTTOM VIEW



SILVERTONE MODEL 9280

SET 94 FOLDER 9

SILVERTONE MODEL 9280



IF = 455 KC

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	4VDC	82VDC	90VDC	0V.	4VDC	.1VDC	5.3VDC
V 2	1R5	1.4VDC	90VDC	44VDC	1VDC	1.4VDC	0V.	2.7VDC
V 3	1U4	2.7VDC	90VDC	90VDC	0V.	2.7VDC	.1VDC	4VDC
V 4	1U5	0V.	14.5VDC	14.5VDC	-.2VDC	0V.	0V.	1.4VDC
V 5	3V4	5.3VDC	87VDC	92VDC	0V.	6.9VDC	.1VDC	8.3VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1U4	*	†23.5KΩ	†1.5KΩ	Inf.	*	5 Meg.	*
V 2	1R5	*	†1.5KΩ	†31.5KΩ	95KΩ	*	3.5 Meg.	*
V 3	1U4	*	†1.5KΩ	†1.5KΩ	3.5 Meg.	*	10 Meg.	*
V 4	1U5	*	†1 Meg.	†4.7 Meg.	1 Meg.	Inf.	10 Meg.	*
V 5	3V4	*	†2.3KΩ	†1.6KΩ	Inf.	*	2.4 Meg.	*

† MEASURED FROM OUTPUT OF M1.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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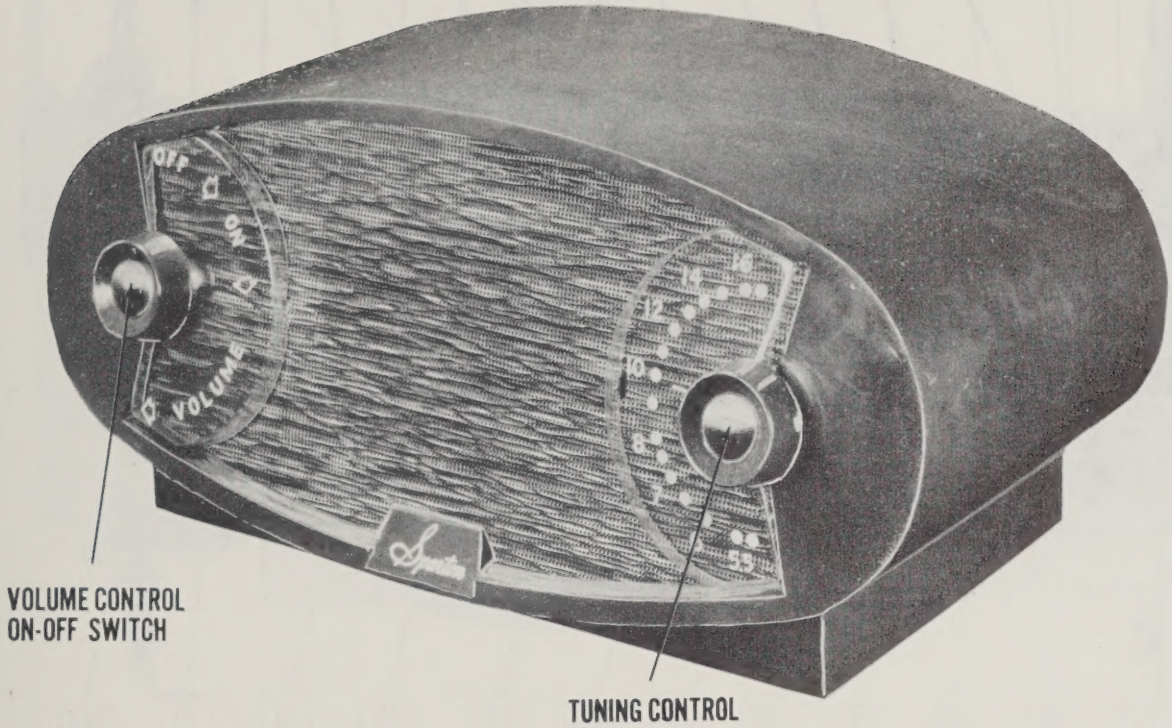
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SPARTON
MODELS 130, 132, 135, 139 (Ch. 5A10)



SPARTON
MODELS 130, 132, 135, 139 (Ch. 5A10)

SPARTON MODEL 132

TRADE NAME	Sparton, Models 130, 132, 135, 139 (Ch. 5A10)
MANUFACTURER	Sparks-Withington Co., Jackson, Michigan
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types 12BE6 Converter, 12BA6 IF Amp., 12AV6 DET-AVC-AF, 50L6GT Power Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.27 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to last reference mark at low frequency end of dial. Use isolation transformer if available. If not connect a .1MFD capacitor in series with low side of signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.02MFD	High side to pin 7 (Grid) of 12BE6 (V1). Low side to B-.	456KC (400 ∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1650KC	"	"	A5, A6	Adjust A5 for maximum output. Do not adjust A6 unless A5 has insufficient range. Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1500KC	Tune for max. output	"	A7	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 1, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1950 by Howard W. Sams & Co., Inc., Indianapolis 1, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

SPARTON MODEL 132

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SPARTON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amp.	12BA6	12BA6	7BK	
V3	DET.-AVC-AF	12AV6	12AV6	7BT	
V4	Power Output	50L6GT	50L6GT	7AC	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SPARTON PART No.	AEROVOX PART No.	CENTRALAB PART No.	ERIE PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
C1A	50	150	PA-4310	PRSA150/50-50			TA-505	Filter-Yellow
B	40	150						Filter-Red
C2	.05	400	PC40HL-503	P488-05			TM-15	Isolation
C3	150	500	MC60G-151	1468-00015	D6-151	GP2K-150	1FM-315	RF Coupling
C4	.1	400	PC40FL-104	P488-1			72P52	Line Isolation
C5	.05	200	PC40GK-503	P288-05			TM-15	AVC Filter
C6	3600	500	MC61F-362	1467-004	D6-472	GP2M-0047	1FM-34	IF Screen Bypass
C7A	100		*	GP100M	D6-101	GP1K-100	1FM-31	Diode RF Filter
B	100			GP100M	D6-101	GP1K-100	1FM-31	Diode RF Filter
C8	10000		PA4334-2	BPD-10	D6-103	821-01	36C1	Audio Coupling
C9	.002	200	PC45GK-202	P688-002	D6-202	GP2M-002	TM-22	AF Amp. Plate Bypass
C10	.01	200	PC40GK-103	P488-01	D6-103	821-01	TM-11	Audio Coupling
C11	.005	400	PC40HL-602	P688-005	D6-502	811-005	TM-25	Output Plate Bypass
C12	.05	400		P488-05			TM-15	Line Filter

* Items C7A, C7B and R7 are combined into one unit obtainable under Mfgr's Part No. PA4329-1.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	INSTALLATION NOTES
R1A	500KΩ	½	PA4400-11	Q13-133	15/16-60-Z	BSK-60-S	Volume control
B	Switch		Not Req.	76-1	SPST SW #	Not Req.	Attach to R1A per instructions

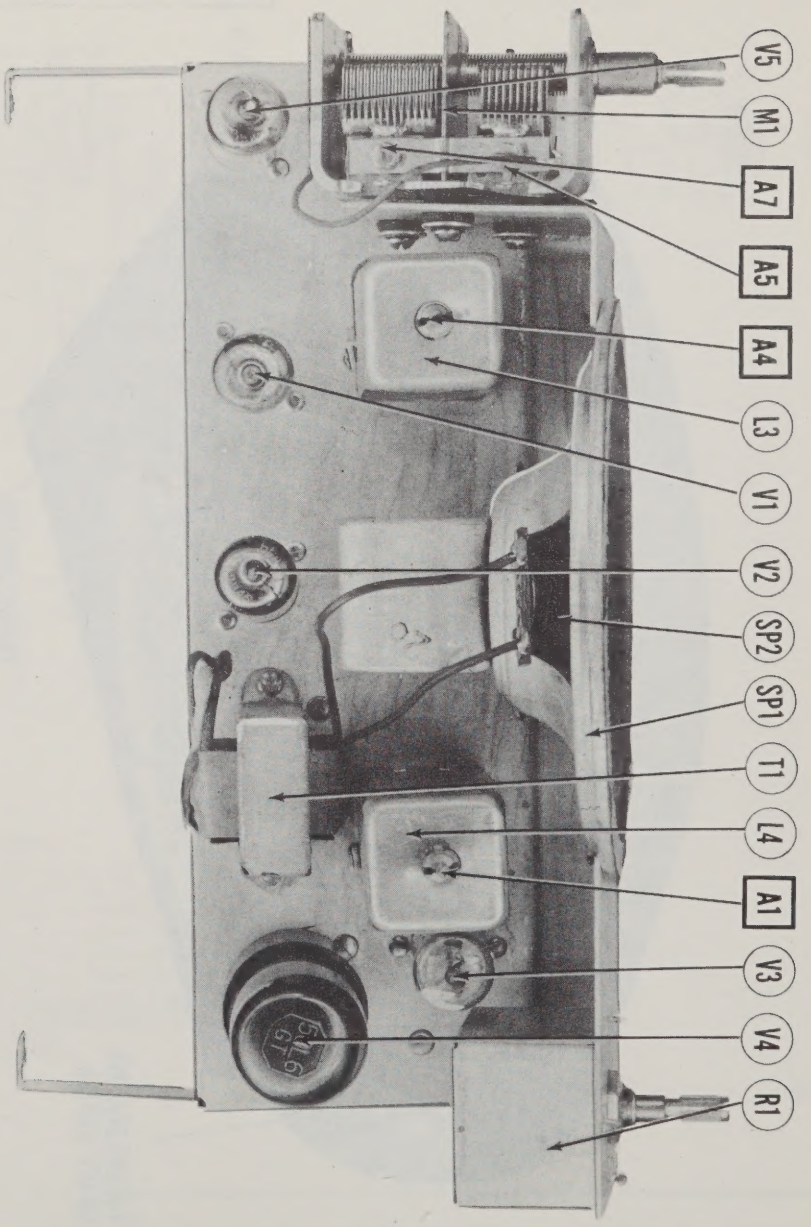
Attached at factory.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	IDENTIFICATION CODES
R2	22KΩ	½	BR12S-223	BTS-22K	Osc. Grid
R3	1 Meg.	½	BR12N-105	BTS-1 Meg.	AVC Network
R4	68Ω	½	BR12S-680	BW-½-68	IF Cathode
R5	470Ω	½	BR12S-471	BTS-470	IF Screen
R6	2.2 Meg.	½	BR12N-225	BTS-2.2 Meg.	AVC Network
R7	47KΩ	½		BTS-47K	Diode Filter-See Note 1
R8	10 Meg.	½	BR12N-106	BTS-10 Meg.	AF Amp. Grid
R9	470KΩ	½	BR12N-474	BTS-470K	AF Amp. Plate-See Note 2
R10	470KΩ	½	BR12N-474	BTS-470K	Output Grid
R11	150Ω	2	BR12S-151	BW-½-150	Output Cathode
R12	1200Ω	1	CR12S-122	BW-1-1200	Filter

Note 1. Items C7A, C7B, and R7 are combined into one unit, obtainable under Mfgr's Part No. PA4329-1
Note 2. Some models use 220KΩ resistor in this application

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SPARTON PART No.	STANCOR PART No.	MERIT PART No.	CHICAGO PART No.	
	PRI.	SEC.	PRI.	SEC.					
T1	2KΩ	3.1Ω	161Ω Tap @ 5.9Ω	.6Ω	AB44065-1	A-3330 *	A-3031 *	RO-3 *	* Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SPARTON PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	V. C. IMP.		ST-107		
SP1	PM	3.1Ω	PC6300-25	MOD. P5-V	5A07	
	CONE DIA.	V. C. DIA.				
SP2	4 7/8"	9/16"				

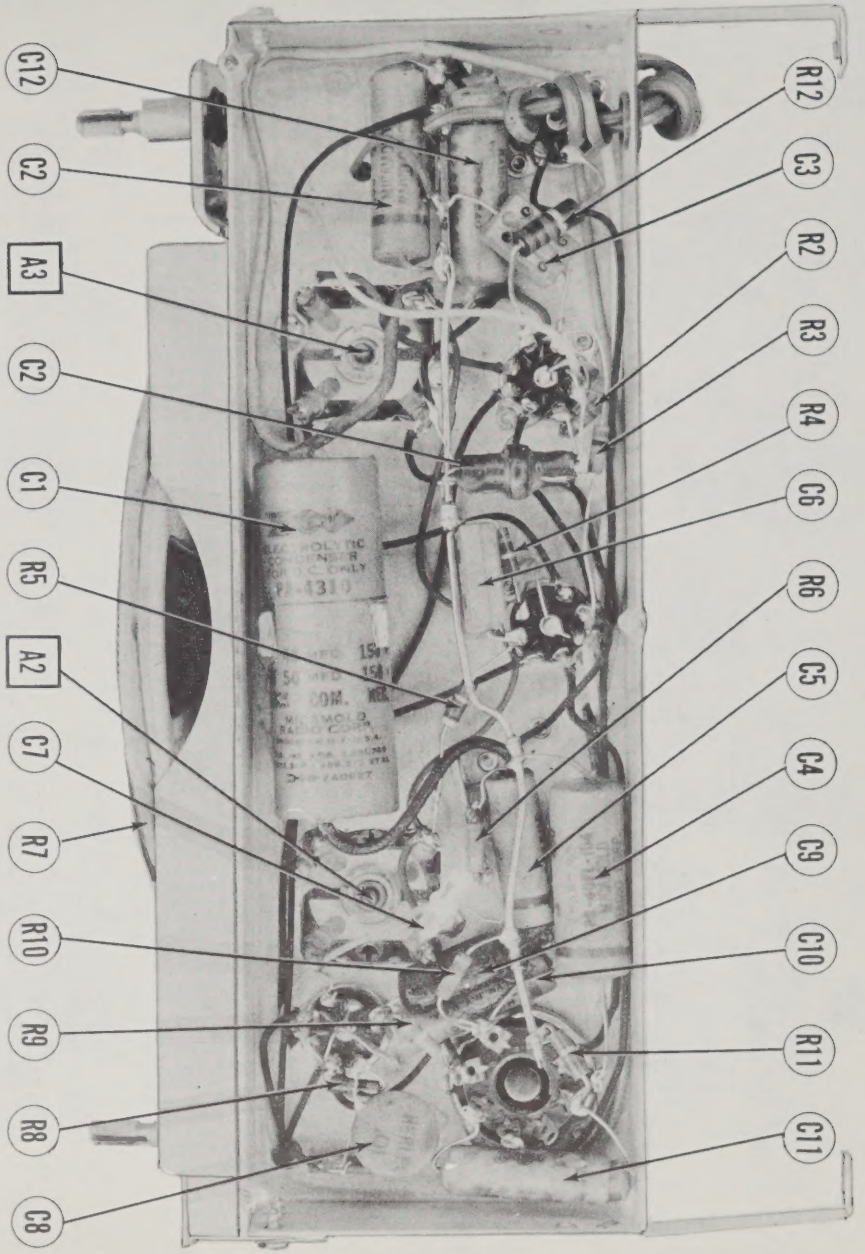
R F COILS

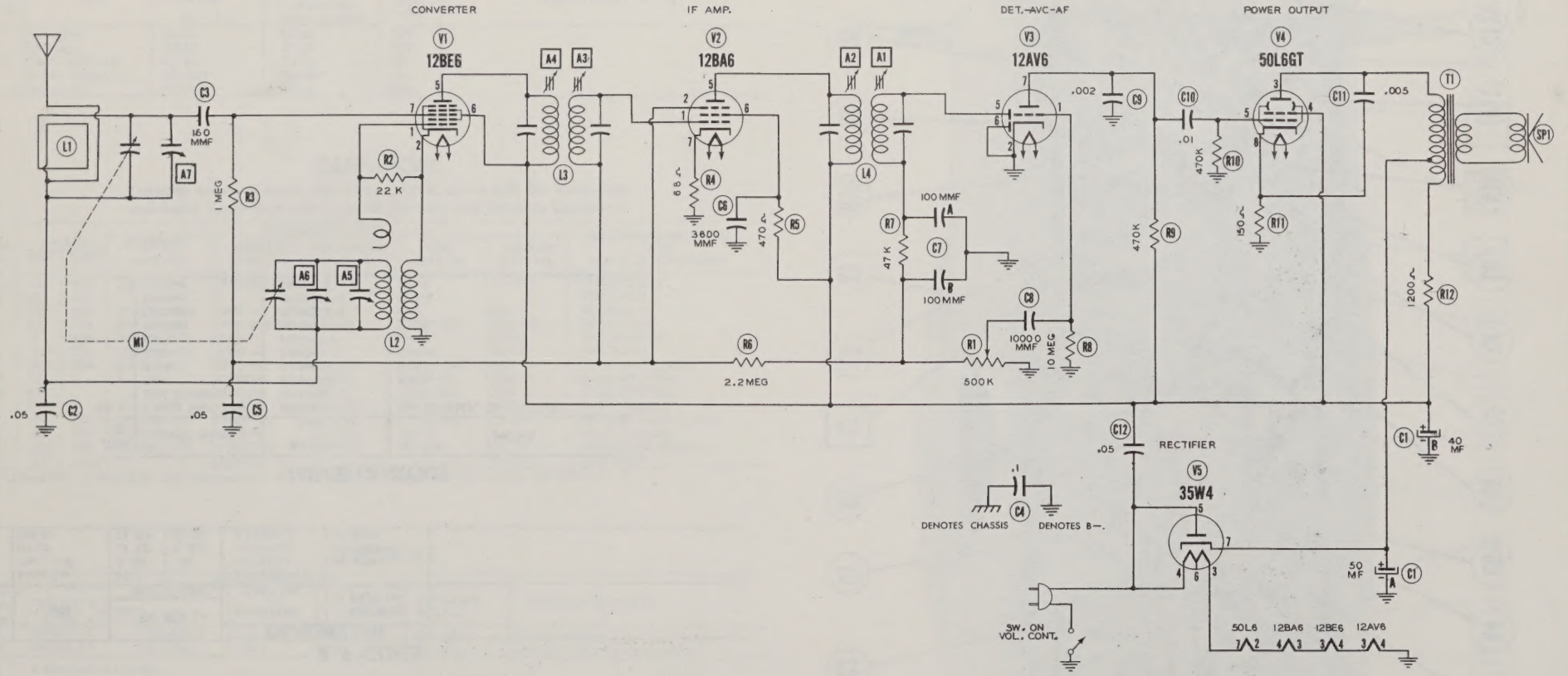
ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	SPARTON PART No.	MEISSNER PART No.
L1	Loop Ant.	2Ω		AB43062-1	
L2	Osc. Coil	5.5Ω	.5Ω	AA6797-1	14-1073
L3	1st IF	12.2Ω	12.2Ω	AA6668-3	16-6666
L4	2nd IF	12.2Ω	12.2Ω	AA6668-4	16-6667

MISCELLANEOUS

ITEM No.	PART NAME	SPARTON PART No.	NOTES
M1	2 Gang Var. Cap.	PB40414	(24-534MMF, 36-208MMF)
	Dial Pointer	PA5410	
	Knob	PA5643-1	Black
	Knob	PA5643-2	Red
	Knob	PA5643-3	Green
	Knob	PA5643-4	Ivory
	Cabinet	PD90032-1	Black
	Cabinet	PD90032-2	Red
	Cabinet	PD90032-3	Green
	Cabinet	PD90032-4	Ivory

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BE6	§-6.2VDC	0V.	24VAC	13VAC	108VDC	108VDC	0V.	
V 2	12BA6	-.1VDC	-.1VDC	24VAC	35VAC	108VDC	105VDC	9.5VDC	
V 3	12AV6	-.6VDC	0V.	13VAC	0V.	-.4VDC	0V.	53VDC	
V 4	50L6GT	0V.	35VAC	132VDC	108VDC	0V.	0V.	84VAC	7.3VDC
V 5	35W4	0V.	132VDC	84VAC	117VAC	117VAC	110VAC	132VDC	

§ TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12BE6	22KΩ	.5Ω	27Ω	15Ω	†1200Ω	†1200Ω	4 Meg.	
V 2	12BA6	3 Meg.	3 Meg.	27Ω	39Ω	†1200Ω	†1600Ω	68Ω	
V 3	12AV6	10 Meg.	0Ω	15Ω	0Ω	540KΩ	0Ω	†470KΩ	
V 4	50L6GT	Inf.	39Ω	†155Ω	†1200Ω	470KΩ	0Ω	90Ω	150Ω
V 5	35W4	Inf.	1 Meg.	90Ω	125Ω	125Ω	115Ω	1 Meg.	

† MEASURED FROM PIN 7 OF V5.

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.